December 5, 1942

Railway Age

Founded in 1856

SAVE 1500 LBS. of CRITICAL STEEL

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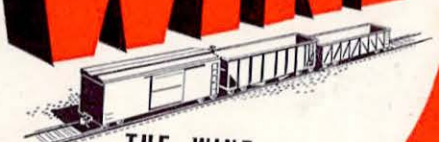
WINE



THE WINE
RAILWAY APPLIANCE CO.
TOLEDO, OHIO

WINE DOOR LOCKS

Less Weight Longer Life

Schaefer Forged Steel Foundation Brake Gear Parts make for minimum service replacements. They are standard on 80% of cars in service.

Schaefer EQUIPMENT COMPANY

KOPPERS BUILDING • PITTSBURGH, PA.

LOOP, "U" AND STIRRUP TYPE BRAKE BEAM HANGERS... TRUCK, CYLINDER AND FLOATING LEVERS
TRUCK LEVER CONNECTIONS... BRAKE ROD JAWS... WEAR PLATES... BRAKE SHOE KEYS

Published weekly by Simmons-Boardman Publishing Corporation, 1309 Noble Street, Philadelphia, Pa. Entered as second class matter, January 4, 1933, at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription price $6.00 for one year U. S. and Canada. Single copies, 25 cents each. Vol. 113, No. 23.

MINER
TRUCK SPRING SNUBBER
W.H. MINER, INC.
CLASS C-2-XB
TRUCK SPRING
SNUBBER
PATENTED.
SAFEGUARDS
LADING
W. H. MINER, INC. CHICAGO

HYDRAULIC ACCUMULATORS

AS the name implies, hydraulic accumulators are used for storing hydraulic power to ensure constant pressure as the power is being used faster than the pumps can produce it. It is the "flywheel" of a hydraulic system. Until recently, an accumulator was a cumbersome piece of apparatus, demanding constant expense for maintenance on account of the moving parts. Now it is built of welded plate construction with a forged steel head or a one-piece cylinder made from a solid.

WE have made a great number of forged steel heads for hydraulic accumulators. Those on one order are 45 3/4 inches in diameter with a metal thickness of 6 3/4 inches. They are an integral part of a vessel which will contain air, gas, or liquid at pressures up to 4500 pounds per square inch. The steel for these heads is made in the same furnaces and poured in the same molds as the steel from which we make our rolled steel wheels and locomotive tires. All three items are the last word in quality.

EDGEWATER STEEL COMPANY, PITTSBURGH, PA.

Sales Offices:

ATLANTA BALTIMORE BOSTON CHICAGO CLEVELAND KANSAS CITY
LOUISVILLE NEW YORK PHILADELPHIA PORTLAND ST. LOUIS ST. PAUL
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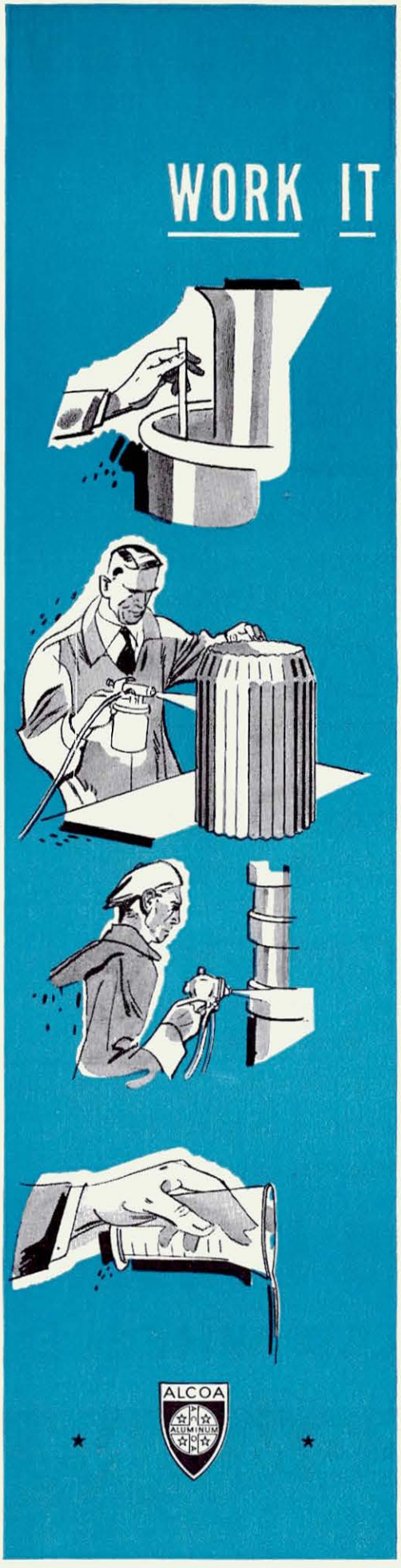
WORK IT HARD, BUT GUARD IT WELL



OF COURSE, you are driving your Aluminum Alloy equipment to the limit. We need every gallon, every pound, every foot, every piece of the products that can possibly be produced to help win the war. But, bear in mind that you must make your equipment last a long time.

YOU CAN lengthen the life of hard-working, irreplaceable Aluminum Alloy equipment. Here are some ways of doing it; each must be engineered to suit the problem.

CATHODIC PROTECTION has proved effective where the chemicals or cooling water employed are corrosive. Simply add zinc strips in the right places, and the corrosive attack is stopped or slowed down considerably. Alcoa engineers, with years of research on such problems, can advise you on how and where to place those zincs.

PROTECTIVE COATINGS offer another means of making Aluminum Alloy parts last longer. Corrosion-resisting, pure Aluminum coatings can be applied by spraying. Oxide finishes are produced by chemical and electrolytic treatment. Baked resin coatings are very effective, where Aluminum is subjected to severe attack.

METALLIZING—building up worn, corroded, or damaged Aluminum parts with new metal—will give these parts a new lease on life.

INHIBITORS may be the key to longer life of Aluminum Alloy processing equipment. Only a few parts of inhibitor per million of liquid are needed to deprive corrosive materials of their kick. Here again, the research of Alcoa engineers will guide you.

ALCOA ENGINEERS stand ready to help you get every possible hour of service out of your Aluminum Alloy equipment. Write and tell us your problems. Aluminum Company of America, 2178 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA ALUMINUM

GRIFFIN WHEEL COMPANY

Transportation Is One of the Country's Greatest Problems

12 GRIFFIN PLANTS

are strategically located at important railroad centers to assure shortest haul of new and scrap wheels.

KEEP THE CARS ROLLING

ON GRIFFIN CHILLED WHEELS

GRIFFIN WHEEL COMPANY

410 NORTH MICHIGAN AVE., CHICAGO, ILL.

PLANTS						
	Chicago	Boston	Cincinnati	Kansas City	Denver	Los Angeles
	Detroit	Cleveland	St. Paul	Council Bluffs	Salt Lake City	Tacoma

PUSHING LAZY BOX CARS ALONG

A Chicago candy company's traffic manager telephoned to the traffic manager of a neighboring factory: "Bill, you've held ten cars of freight on your siding for ten days. Why don't you unload them and let someone else use them?"

That would have been fighting language a few years ago when I worked in Chicago. It was close to insulting language in 1936. Bill would have given a snappy answer in 1938. But Bill and his neighbor are now working together. They know this is a war of movement—production is valueless without transportation, and railroad transportation is this war's "front line."

Hence, Bill promptly telephoned New York headquarters for permission to unload those 10 cars into a warehouse—and in less than an hour he saw a switch engine move those "lazy box cars" off his siding.

Quick action of this kind is typical of 1942 railroading because the railroads have the organized support and co-operation of the thirteen regional Shippers Advisory Boards, which now cover the country. The first of these Boards was organized in Minneapolis in 1923. Others followed soon thereafter.

These Advisory Boards have been carrying on ever since and now, with their national association leading the way, they are seeing to it that freight cars are not only loaded promptly and heavily, but also are unloaded immediately and released for further transportation service. Thus are shippers and receivers—like Bill and his neighbor—helping to keep freight cars rolling and at the same time giving themselves and the railroads a break.

The important thing is to get the most ton-miles out of each car, for our railroads are handling the largest freight movement in United States history with approximately 600,000 fewer cars than they had in 1929.

Our railroads asked the War Production Board for 100,000 more freight cars to help them through the 1942 emergency. Actually, they will get only about 62,000. But regardless of that, the railroads are keeping munitions trains, troop trains, oil trains, coal trains, and merchandise trains rolling on schedule—by teaming up with shippers and receivers.

Local Car Efficiency Chairmen, freight agents, and American Association of Railroads' car-service representatives are policing freight yards and pushing lazy box cars along. I've met shippers and receivers who handle their own tough cases now without urging or assistance.

A Chicago manufacturer suddenly found 27 carloads of semifinished stock on his sidetracks, waiting for final assembly. Instead of leaving those cars on that track for weeks, the company promptly had the stock shipped to temporary storage in its Rockford, Streator, and Indianapolis branch factories.

The 27 empty cars then returned to hauling loads for other manufacturers. Each moving car was part of the national movement toward victory.

—The Trackwalker

AMERICAN LOCOMOTIVE • GENERAL ELECTRIC

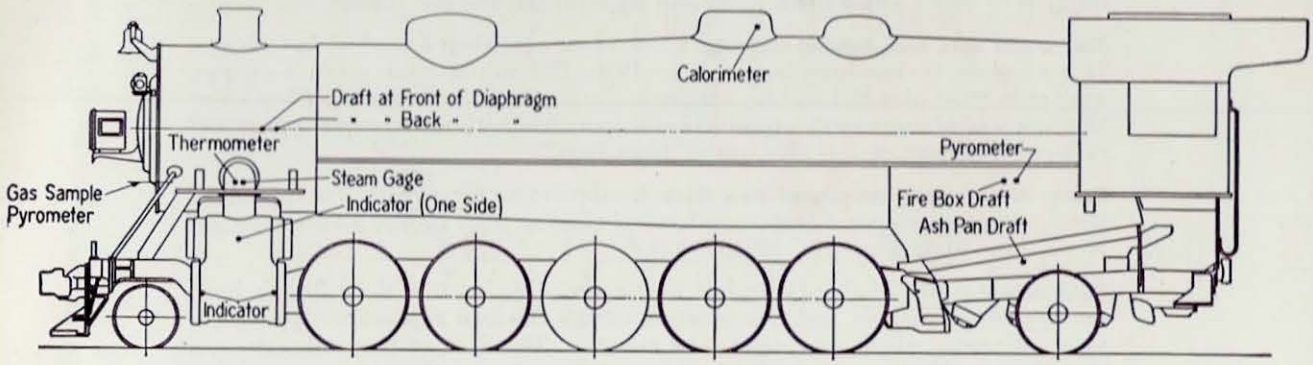
114-d8-9600

Now Ready

THE STEAM LOCOMOTIVE

By RALPH P. JOHNSON, M. E.

Chief Engineer, The Baldwin Locomotive Works



This is a complete treatise on the theory, operation and economics of the American steam locomotive. It is based upon current practice and recent research and material that has been tested out by the author and his co-workers. Comparisons are drawn with Diesel-electric and other types of motive power.

The author is a recognized authority on locomotive design, construction and testing. His experience in testing locomotives here and abroad with the aid of dynamometer cars is drawn upon for interesting observations on road testing methods.

To keep the subject matter as short as possible it has been stripped down to fundamentals, with just enough background included to indicate paths of development. The many tables have been checked against latest available data and the line drawings have been specially made for this book.

Sent on Ten Days' Free Examination

FREE EXAMINATION COUPON

Simmons-Boardman Publishing Corporation
30 Church Street, New York, N. Y.

Please send me a copy of R. P. Johnson's new book, THE STEAM LOCOMOTIVE, on 10 days' free examination. I will either remit the list price of $3.50 or return the book postpaid.

Name.....

Address.....

City.....State.....

Company.....Position.....

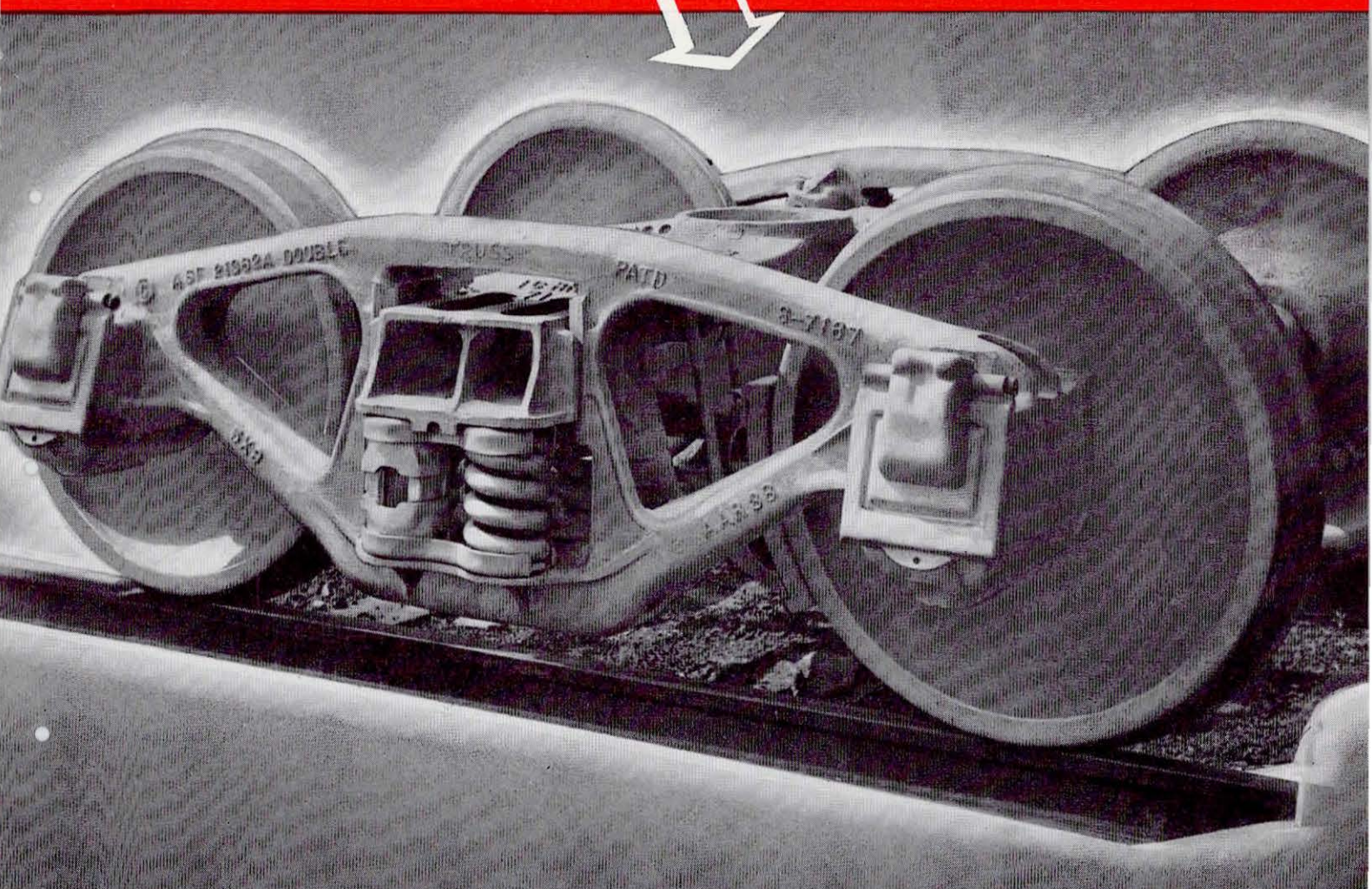
R. A. 12-5-42

Table of Contents

Locomotive Classification—Locomotive Fuels—Combustion—Front Ends—Locomotive Cinders—Water for Boiler Use—Evaporation—Superheat—Tractive Force—Horsepower—Resistance—Tonnage Rating—Curves—Valve Gears and Valve Setting—Counterbalancing—Acceleration—Torque Diagrams—Locomotive Testing—Dynamometer Cars—High Speed Trains—Streamlined and Light Weight Trains—Motive Power for High Speed Service—Motive Power for Switching Service—Relation of Locomotive Operating Expense to Net Operating Income—Locomotive Repair Costs—Economic Life. Appendix A—Locomotive Testing Apparatus. Appendix B—Derivation of Economic Life Formula. Appendix C—Typical Locomotive Dimensions.

502 pages, 100 drawings and photographs, 70 tables, 6 x 9, cloth, $3.50

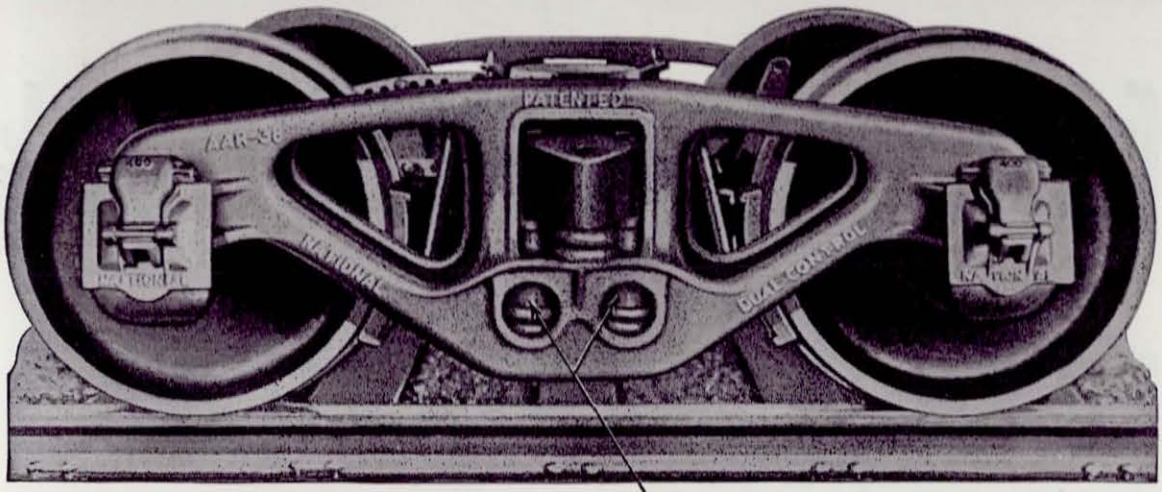
Over 120,000 car sets of SELF-ALIGNING Trucks are now in service



AMERICAN STEEL FOUNDRIES

Chicago

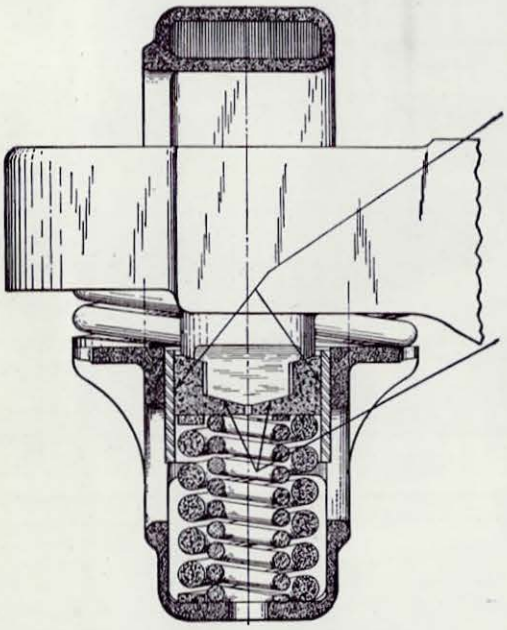
NATIONAL B-1 TRUCKS with DUAL CONTROL



TWO FRICTION UNITS

National B-1 Trucks with Dual Control

assure safety and smooth riding in high speed service.



Section thru Control Unit
2 Units in each side frame

Built-in features that control both the vertical and horizontal oscillations assure superior riding qualities and greater safety.

CONTROL No. 1

Vertical oscillation or spring bounce is friction controlled by pressure of wedges against a steel bushing, during spring action. This protects the lading.

CONTROL No. 2

Horizontal oscillation is controlled by opposing angles of incline on the friction wedges, which center the bolster trunnions and resist forces which tend to throw the truck out of square. This is necessary for safety in high speed service.

Quick Wheel Change
Springs cannot go solid
No spring plates are required
Brake Beam Safety Ledges
Brake Beam leveling links

Complies with all A. A. R. Specification Requirements

NATIONAL MALLEABLE AND STEEL CASTINGS CO.
General Offices: CLEVELAND, OHIO
Sales Offices: New York, Philadelphia, Chicago, St. Louis, San Francisco
Works: Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, Ill.

Canadian Representatives: Railway and Power Engineering Corporation, Ltd., Toronto and Montreal

SEGREGATED *Scrap...* is your link to VICTORY!

Scrap salvage is a vital factor in the war effort. To be fully effective a scrap program must include methods for segregating and conserving critical alloying elements so urgently needed in the construction of tanks, guns, ships and planes.

Ferrous and non-ferrous metal scrap should be collected in separate containers at the machine where they are generated. Each class of high-speed tool steel and each type of constructional alloy steel should likewise be kept separate so that the alloy content can be returned to service.

Remember, — alloy scrap which is segregated, classified and labeled according to type and composition is a vitally important commodity today—and urgently needed to augment primary supplies of Nickel, molybdenum, tungsten, etc.

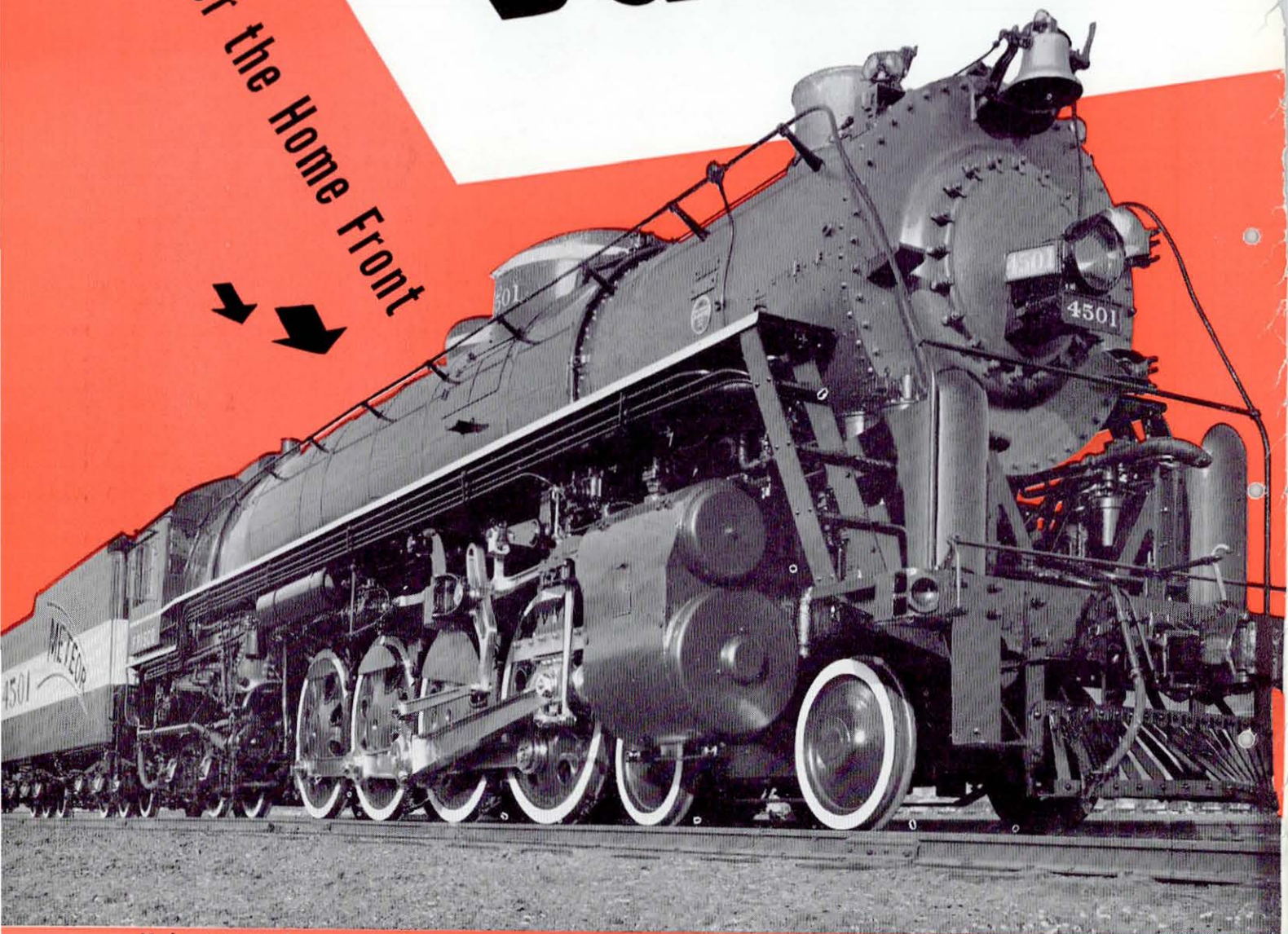
The metallurgical experience of our technical staff is available to aid you in these and other phases of metal salvage.

KEEP SCRAP MOVING INTO WAR PRODUCTION!

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

These are Baldwins

for the Home Front



Modern 4-8-4 type locomotive for the St. Louis-San Francisco Railway.

Baldwin-built M4 Army tanks, of a type that played such a prominent part in driving the Axis forces out of Egypt, are but one of many items of war materiel produced by the Baldwin Group. Anti-aircraft gun tubes, coast defense gun mounts, propellers for naval vessels are some of the other products going to the fighting fronts.

And on the home front, Baldwin continues to supply the locomotives so vital to the job of hauling men and materials in record-breaking volume.

As in the First World War, Baldwin is serving as a bulwark for Victory; devoted to the dual task of producing ordnance materiel for the armed forces, and its regular products for equipping other vital war industries.

for the Fighting Front

Baldwin-built M4 (General Sherman) Army tank.

BALDWIN SERVES THE NATION

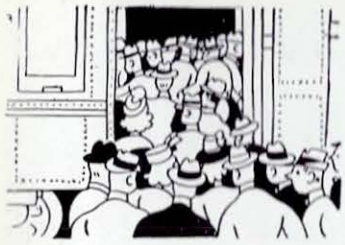
WHICH THE RAILROADS

HELPED TO BUILD

BLW THE BALDWIN GROUP

THE BALDWIN LOCOMOTIVE WORKS

Philadelphia



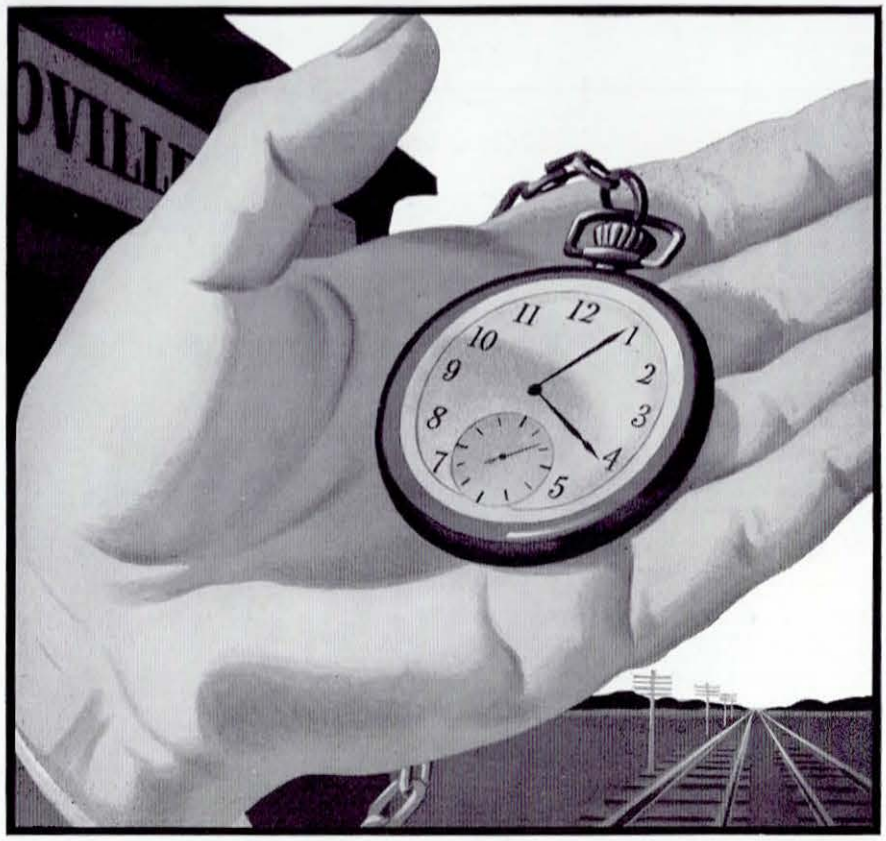
Fewer Cars, More People. The A.R.A.'s count of cars shows 20,000 less than at the time of World War I—yet today's traffic is much greater than then. The comparative smoothness with which this load is handled is a great tribute to railroad efficiency—a great contribution to the war effort. Like railroad men, batteries, too, are working harder. But hard work doesn't bow down an Edison Alkaline Battery. Long ago it demonstrated its greater ability to stand up under extra work and extra-difficult conditions.

Yard-Charging Problems. With layover time of cars reduced, time for yard-charging has in many cases been radically reduced. This means that to keep the batteries charged, more reliance has to be placed on the charging time available on the road. Here's another advantage of Edison Alkaline Batteries: they can be charged at full normal rate right up to and including a fully charged condition.

Going to War. Change in government attitude on drafting men in vital industries will hit railroads hard. They've already lost many men. Needed many new ones, anyway. Unskilled hands are often hard on equipment . . . but seldom hard on alkaline batteries. Their maintenance is easy to learn, easy to do, hard to do wrong.

Edison Storage Battery Division
Thomas A. Edison, Inc.
WEST ORANGE, N. J.

DURATION POWER



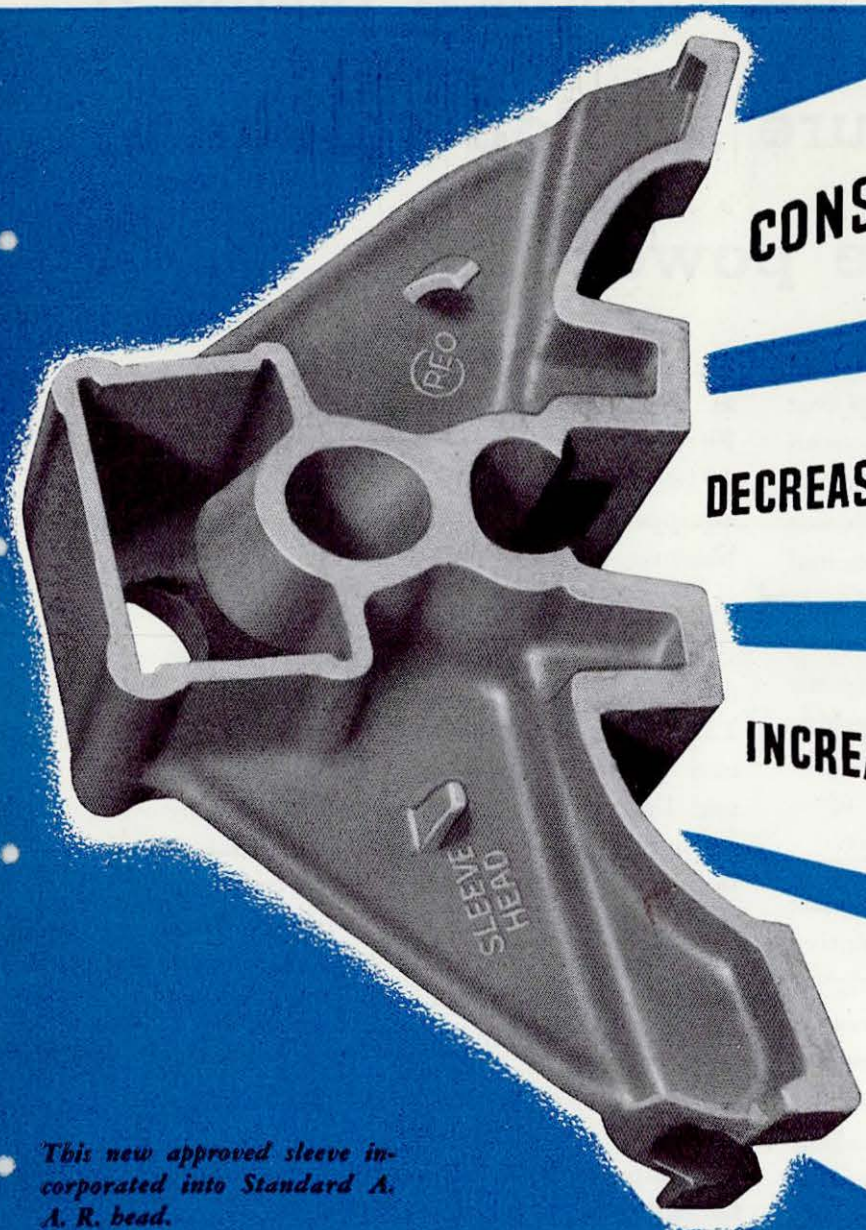
No one can predict how long this war will last—how long the necessity for meeting these abnormal passenger traffic demands will go on. But one prediction can be made with full certainty: the railway batteries of the alkaline type are the ones *most* likely to last for the duration . . . the *least* likely to require battery replacements.

Endurance and dependability were literally designed into Edison Batteries. Electrochemically and structurally they are built to last a long time, to do a lot of hard work, to stand up under trying conditions and to require the least maintenance. The result has been that cars having alkaline battery equipment have the least battery trouble.

RAILROADS NEED THE DEPENDABILITY OF

Edison Alkaline BATTERIES

SLEEVE BRAKE HEAD



This new approved sleeve incorporated into Standard A. A. R. head.

CONSERVES MATERIALS

DECREASES BRAKE BEAM FAILURES

INCREASES TENSION-ROD LIFE

REDUCES TRAIN DELAYS

Over 2,500,000 Sleeve Heads in service is evidence of their value

CHICAGO RAILWAY EQUIPMENT CO.

McCormick Building, Chicago

Past performance points a finger to the future for Roller Bearing Equipped motive power . . . .

How the New York Central System met the continuing demand for increased power in passenger locomotives (common with nearly all railroads) is described by P. W. Kiefer, Chief Engineer, Motive Power and Rolling Stock, in his paper presented to the A.S.M.E., annual meeting June 16-19, 1941 at Kansas City, Mo. In this achievement one of the important factors was the increased use of approved roller bearings from year to year. The following information in this advertisement is based upon the data found in Mr. Kiefer's Paper.

Prior to 1926 the New York Central made several basic improvements in locomotive and tender designs which resulted in higher speeds, longer sustained runs and increased hauling capacity. However, it was recognized that a basically new design must be developed which became the J1 Hudson type. 205 of these were placed in service between 1927 and 1931. Subsequently roller bearings were installed in all engine and tender trucks and in the drivers of eight locomotives.

The experience accumulated with the altered locomotives of the J1 class determined the objectives for what was later known as the Improved Hudson type class J3. Fifty of these were built in 1937 and 1938—all wheels were roller bearing equipped—five were equipped with roller bearings on main and side rods.

To improve availability of important motive power units, the N.Y.C. decided to alter two Mohawk freight engines, class L2, for tests and operation in both freight and passenger service. Roller bearings and light-weight reciprocating parts were among the changes. Their performance pointed the way to the improved combination express, passenger and freight locomotive known as the L3. 25 of these were placed in service with roller bearings on all wheels including drivers.

In the concluding remarks of Mr. Kiefer's Paper on trends of steam locomotive design improvement for the immediate future, he had this to say about roller bearings: "Roller Bearings in all locomotive and tender axle journals and to a lesser degree in rods and motion work have resulted in increased serviceability because of freedom from heating failures. Their extended utilization should receive careful consideration."

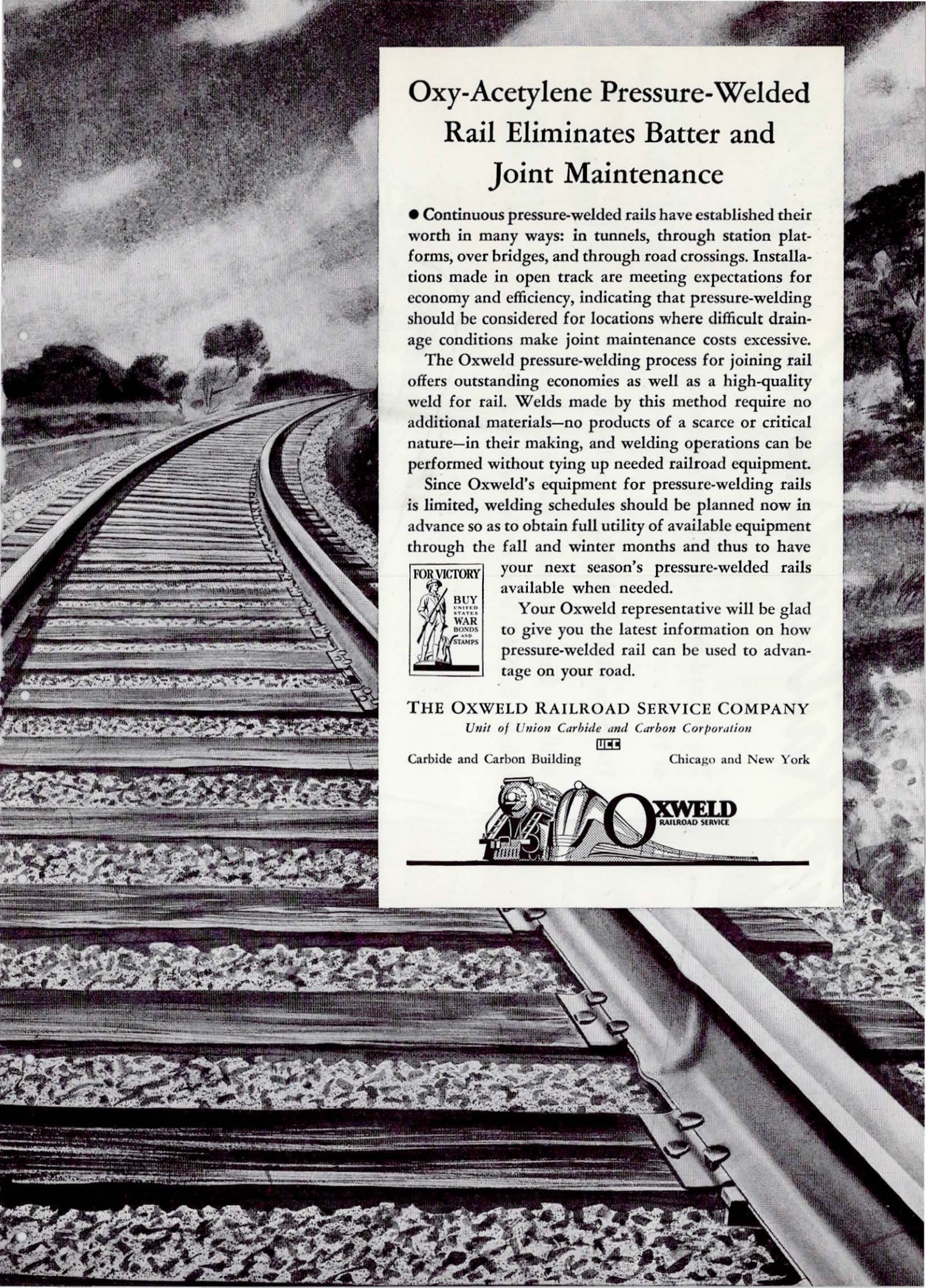
THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

"ALL THERE IS IN BEARINGS"

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

RAILWAY ROLLER BEARINGS



Oxy-Acetylene Pressure-Welded Rail Eliminates Batter and Joint Maintenance

● Continuous pressure-welded rails have established their worth in many ways: in tunnels, through station platforms, over bridges, and through road crossings. Installations made in open track are meeting expectations for economy and efficiency, indicating that pressure-welding should be considered for locations where difficult drainage conditions make joint maintenance costs excessive.

The Oxweld pressure-welding process for joining rail offers outstanding economies as well as a high-quality weld for rail. Welds made by this method require no additional materials—no products of a scarce or critical nature—in their making, and welding operations can be performed without tying up needed railroad equipment.

Since Oxweld's equipment for pressure-welding rails is limited, welding schedules should be planned now in advance so as to obtain full utility of available equipment through the fall and winter months and thus to have your next season's pressure-welded rails available when needed.

Your Oxweld representative will be glad to give you the latest information on how pressure-welded rail can be used to advantage on your road.

THE OXWELD RAILROAD SERVICE COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

Carbide and Carbon Building — Chicago and New York

What the Railroads Did in 1942

The Record-Breaking Railway Operations of 1942 . . .

The Even Bigger Job Ahead for 1943 . . .

Will Be Surveyed and Analyzed in the January 2, 1943, Issue of the *Railway Age*.

And What's Ahead for 1943

"Transportation is Vital for Victory"

Make Space Reservations Early Send Copy and Cuts Promptly

Annual Statistical and Outlook Number

The 1943 Annual Number Will Feature an Unprecedented Editorial Content . . .

Extra Washington Distribution . . . Timeliness as the FIRST Report of the Year's Activity

COMING at the close of the greatest performance year in the history of the railroads, and at the opening of the even more crucial year 1943, the forthcoming Annual Statistical and Outlook Number of the *Railway Age* will be an unprecedented issue . . . as a service to the railway industry and as a medium for transmitting manufacturers' product information and specialized "know-how" to railway men.

An Authoritative Reference

The Annual Number—to be published on January 2—will be the *first* survey and statistical report to reach railway headquarters throughout the industry promptly after the first of the year. In its comprehensive Outlook Section and Statistical Section, it will give the detailed facts of the all-time record railway performance of 1942 and the outlook for the crucial year ahead.

A Recognized Institution

It is the statistical and analytical data—much of which is available from no other source—that make the Annual Statistical and Outlook Number so widely read and used. The Annual Number represents a reference service of over 35 years' standing . . . an issue that is sought and used in railway, government and business circles throughout North America and in many other parts of the world.

Heavy Demand for Copies

One indication of the value of this reference issue is the fact that the railroads purchased nearly 1000 extra copies of the 1942 edition in order to assure an ample supply in their offices for timely reference throughout the year.

Extra Washington Distribution

In keeping with the importance of the railroads in the war program and the vital transportation decisions being made in Washington, D. C., copies of the 1943 Annual Statistical and Outlook Number will be sent to all members of the new 78th Congress convening in January, in addition to the key members of the War Production Board and the Office of Defense Transportation who receive the *Railway Age*.

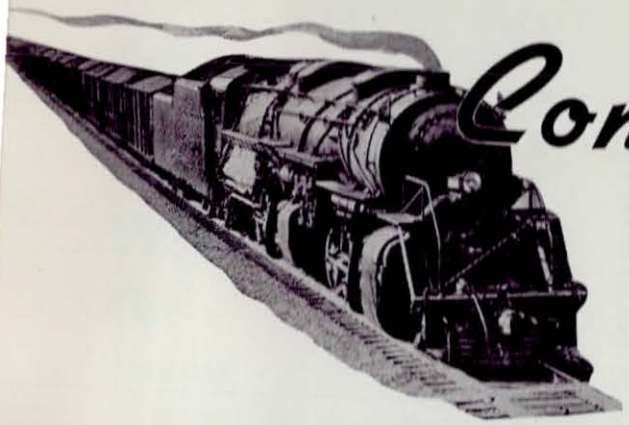
To Manufacturers:

When railway officers and government transportation officials are studying the Annual Number it is logical that they should be particularly attentive to the part manufacturers are playing in the battle of transportation. Plan to tell *your* story in the January 2, 1943, issue. Make this Annual Number the opening gun of your 1943 campaign to give railway men information that will help them produce more transportation with available equipment and materials.

May we urge prompt action in reserving space and a special effort to forward copy *well in advance of the closing date*, to allow time for careful handling. War-time conditions this year make it especially important to send your copy and cuts early.

January 2, 1943, Issue

One Way to Help *Maintain Consistent* SCHEDULES



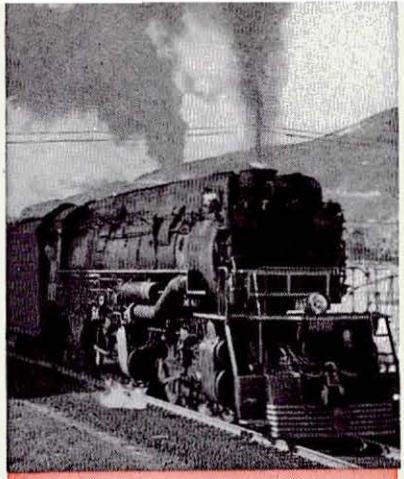
Preserve . . . AIR COMPRESSOR *. . . Reliability*

TRAIN delays are costly. To make up lost time often requires operation at uneconomical speeds if schedules are to be maintained . . . You can be doubly sure that no interference with running time is caused by air compressors when they are kept clean and properly lubricated. To this end our Suction Filter and Mechanical Lubricator are very effective . . . Outstanding results have been attained by leading railroads — service life of compressors lengthened three to six times — satisfactory performance throughout the entire period between locomotive shoppings.

For YOU also, these devices will contribute materially to greater locomotive availability and continuity of train service. » » » »

WESTINGHOUSE AIR BRAKE CO.

WILMERDING, PENNA.



PUBLISHED EACH SATURDAY BY THE SIMMONS-BOARDMAN PUBLISHING CORPORATION, 1309 NOBLE STREET, PHILADELPHIA, PA., WITH EDITORIAL AND EXECUTIVE OFFICES AT 30 CHURCH STREET, NEW YORK, N. Y., AND 105 W. ADAMS STREET, CHICAGO, ILL.

WASHINGTON, D. C.: 1081 NATIONAL PRESS BUILDING. CLEVELAND: TERMINAL TOWER. SEATTLE: 1038 HENRY BUILDING. SAN FRANCISCO: 300 MONTGOMERY STREET, ROOMS 805-806. LOS ANGELES: 530 WEST 6th STREET.

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Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name registered U. S. Patent Office.

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No Delays to War Traffic on This Tunnel Repair Job ***910***

How the Pittsburgh & West Virginia solved the problem of restoring a 300-ft. failure in a section of concrete lining of an important double-track main-line tunnel by installing liner plates.

Will Railroad Traffic of the Future Require Steam or Diesel? ***913***

An abstract of a paper by L. K. Sillcox, First Vice-President of the New York Air Brake Company prepared for presentation before the Institution of Locomotive Engineers, London, England, in which he sets forth many factors involved in motive power selection and related operating costs.

Airlines—How Dangerous a Rival? ***920***

From an address by W. A. Patterson, President of the United Air Lines, before the National Industrial Conference Board.

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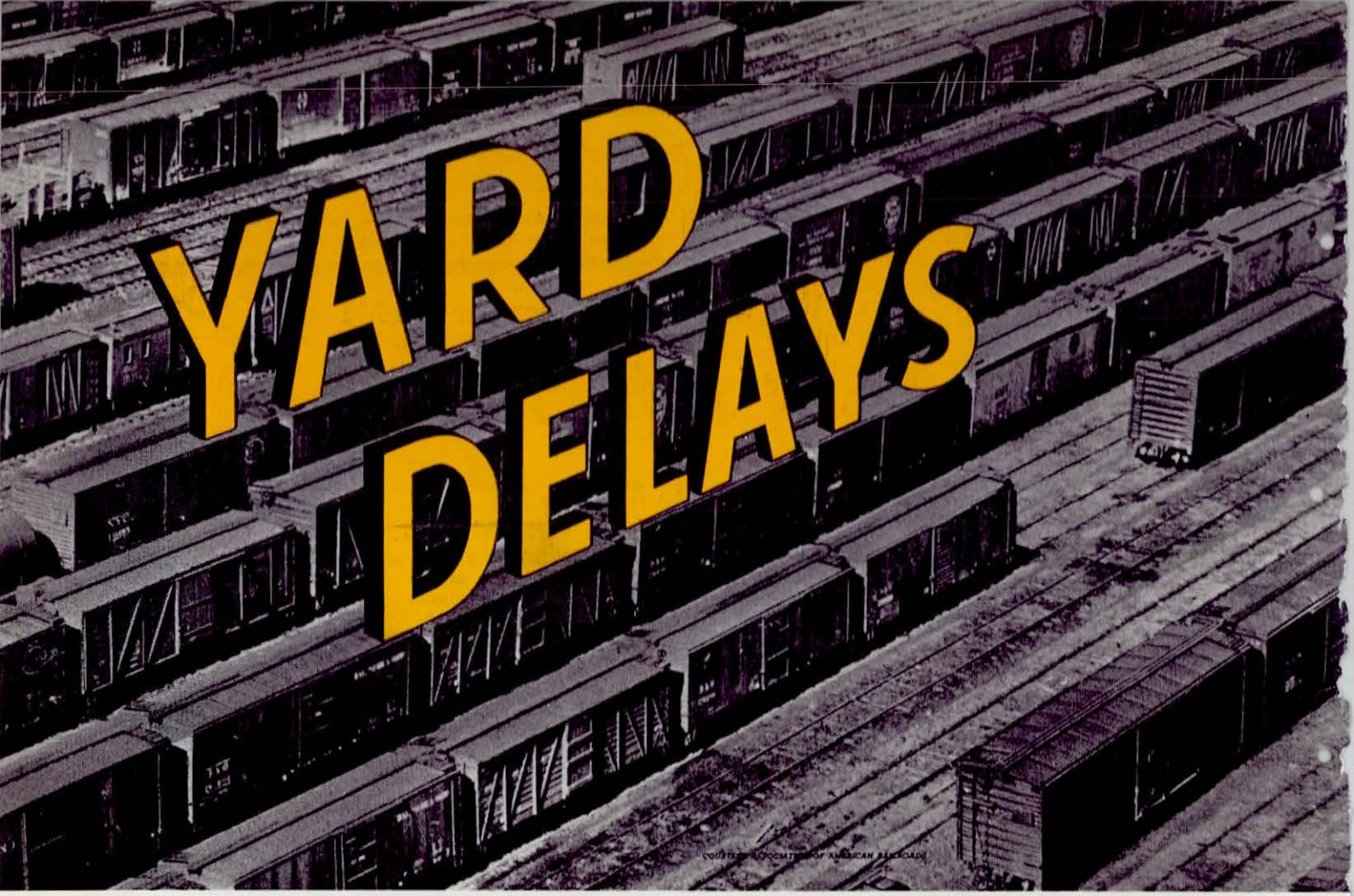
The Railway Age is indexed by the Industrial Arts Index and also by the Engineering Index Service

PRINTED IN U. S. A.



—are avoided with CAR RETARDERS and YARD COMMUNICATION!

THE railroads have established a splendid record of getting trains over the road, and it is vital that main line performance be matched by equally fast operation in yards. Signaling affords two important aids to efficient yard operation—car retarders and yard communication.

"Union" Electro-Pneumatic Car Retarders produce maximum efficiency in the handling of cars from the hump to the classification tracks. A retarder-equipped yard is constantly available for classification service, and under present conditions of heavy traffic and scarcity of man power this means that cars can be moved without delay.

"Union" Yard Communication is the modern means of conveying instructions to the crews of engines working in yard areas. Because of the complete instructions which may be conveyed to each engineman, regardless of weather conditions, overall yard operations are improved and cars are speeded from the receiving to the departure yard.

UNION SWITCH & SIGNAL COMPANY
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The Week at a Glance

VERY, VERY CLEVER: A frontal attack on private ownership of railroads wouldn't, probably, attract a large or enthusiastic following. And yet, somehow, government ownership must be connived—if we are to have post-war socialism, thus assuring the future of thousands of federal sociologists and "experts" who are happy indeed in their bureaucratic power. An interesting dilemma for the boys—but not too tough for them to tackle, because such hocus-pocus is their specialty. Banking on the large public acceptance they have drummed up for heavy post-war government "pump-priming," they softly suggest government ownership only of railways' *roadways*—ostensibly so tax money can be poured into them as it is into highways and canals. This ingenious scheme is taken apart in the leading editorial herein.

●

WHY PUBLIC SPENDING?: At the end of the last war, the federal government sharply *reduced* its outlays—and *private investment* so largely increased that, in a decade, national income had risen 51 per cent above its pre-war level. The editorial discussion herein asks wherefore the present unlikely assumption that private enterprise, given the opportunity, would not once more proceed greatly to increase the national income, without burdening the taxpayers. The purpose of these machinations is very plain: These New Deal schemers are planning these large post-war outlays—not because of any persuasive evidence of need for them to sustain the economy—but because they are the *certain road to a totalitarian state,* which these bureaucrats expect to control and operate.

●

SILLCOX ON MOTIVE POWER: The increase in cost of steam locomotives, as power is augmented and refinements are added—combined with declining cost of Diesel-electrics by reason of standardization and mass-production methods—has served to narrow the initial price advantage of steam power, thus further stimulating the rivalry between these means of propulsion. The diminution of the price spread between the two types of power necessitates an exacting study to choose wisely between them. The Diesel-electric locomotive is "an effective compromise between electrification and steam power." With these and other pointed observations L. K. Sillcox opens a characteristically painstaking and informative analysis of the competitive situation in motive power—an abstract appearing elsewhere herein.

●

AIRPLANE RIVALRY: W. A. Patterson, president of United Air Lines, in an address reported herein, makes a cost comparison of plane and train service between Chicago and San Francisco—indicating that the fuel expense of handling 1560 tons in both directions between these terminals would be $3,400 by train and $200,000 by plane. Total out-of-pocket operating expenses would be $50,000 by train and $1,750,000 by plane. Mr. Patterson concludes that the plane will not be a serious rival of the railroads for freight traffic, but will get in its rivalry on passengers, mail and some classes of express. He believes also, however, that the plane will be a business-builder, and as such may well promote more railroad freight patronages than it takes away in other traffic.

●

WHAT AIR FREIGHT IS: Mr. Patterson says that one or more of the following conditions are necessary in order for freight to move by air: (a) An emergency to be met, (b) an opportunity for a substantial saving in warehousing or inventory costs, (c) sufficiently high value per lb. of the commodity to make worthwhile savings in financial and insurance costs. This is another way of saying that freight will move by air when factors other than the cost of movement are controlling—and sufficiently compelling to offset a large premium in transportation charges. Air transport, thus, is not "inherently inexpensive"—as some of its non-analytical enthusiasts insist—but is inherently quite the contrary.

●

R. F. & P. METHODS: In June, 1940, 58 trains daily; in June, 1941, 65; in June, this year, 86; in October, this year, 100. Such has been the increase in traffic the R. F. & P. has had to handle—and that is only part of the problem, because trains are much more heavily loaded. For example, passengers handled in the first six months, 1942, were 80 per cent of the *entire year's* traffic in 1941. An illustrated article herein records the noteworthy aspects of this road's job.

●

STILL LESS THAN 5%: Earnings for the ten months are reviewed in the news pages herein—net railway operating income being 1160 millions, as compared with 850 millions last year; and estimated net income totaling about 708 millions, as compared with last year's 413. These figures are large only by comparison—because the rate of return during the past 12 months is still below 5 per cent, which most businesses would consider pretty slender pickings, especially since such earnings are achieved by the railroads only under conditions of the heaviest public patronage.

●

THIS MUCH WE KNOW: The future doubtless holds many surprises for the transportation industry, but there are several developments, none of them reassuring, which can be predicted with reasonable confidence—so Mr. Eastman told a Los Angeles audience this week. Among these certain conclusions are the following: That troop movements will continue to put larger burdens on passenger capacity, already loaded to very near the limit; that rubber-borne traffic will continue to shrink and will seek diversion to the rails; that national production, and resultant tonnage, will continue to expand; that existing railroad equipment is being driven to the limit; that serious manpower difficulties are just around the corner.

NORRIS TELLS HOW: There are five or six leading factors which have joined together to produce the unprecedented service the railroads are giving, and E. E. Norris enumerated them in a speech to the Manufacturers' Association this week. A common characteristic runs through them all—*co-operation,* which is getting results which coercion, in the last war, was never able to achieve. An abstract appears herein of Mr. Norris' succinct analysis—telling what, why and how.

●

WHY TIES ARE SCARCE: The OPA put a ceiling on tie prices which is too low to keep the producers in the woods, as an editorial herein reveals. The railroads badly need the ties and are willing to pay what they would have to pay to get them. No inflation is involved. What's the use of putting this kind of dangerous and unnecessary burden on an industry which is trying to do a job for the war program?

●

TUNNEL FAILURE AVERTED: An old mine above a P. & W. V. double-track tunnel at Pittsburgh caved in and put a weight on the tunnel lining under which it was in imminent danger of collapse. Temporary timber shoring was installed (necessitating single-tracking the tunnel) and a method of relining the affected area was sought which would offer a minimum of interference to rapidly-growing war traffic. The solution was found in metal tunnel liner plates. An illustrated article herein sets forth the complexity of the problem, and relates how it was solved.

●

BOX LUNCHES RELIEVE DINERS: The New Haven has taken to selling box lunches at South Station, Boston, and Grand Central Terminal, New York, on busy days—to relieve the pressure on its dining cars. A "bar" on wheels for the sale of these lunches is rolled up near the train gate, and personable young women do the vending. Public response is reported favorable.

●

800 M. BBL. OIL TOP?: The railroads have just about reached their capacity in handling 800,000 bbl. of petroleum products daily to the Atlantic seaboard—so J. J. Pelley told the House interstate commerce committee. Motive power is the limiting factor—the carriers already being shy 450 engines which they expected to have by this time, but which lack of materials has denied them. So the limit on oil tonnage is up to the WPB—they "planned it that way." They are similarly planning other transportation shortages for 1943.

●

TANKS DIVERTED: Other factors contributing to the limitation on railroad movement of oil include (a) the seasonal diversion of tank cars to the movement of vegetable oils, alcohol and other liquids and (b) multiplicity of destinations. The railroads operate the tanks in solid blocks, but, nevertheless, they get set-out orders—and the cars are widely scattered for unloading, all of which consumes time.

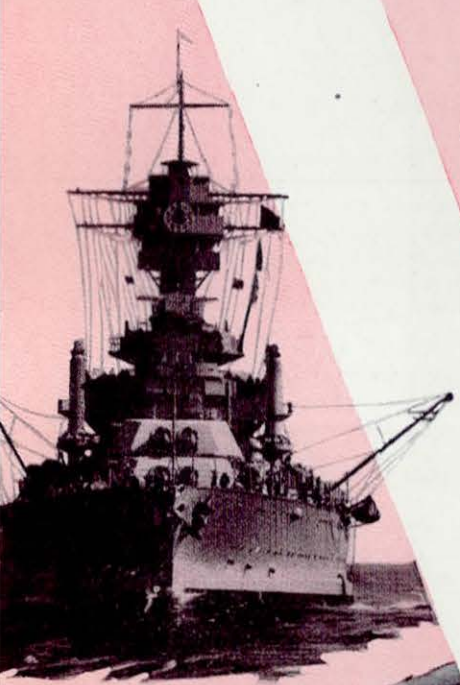
AMERICA'S ANSWER

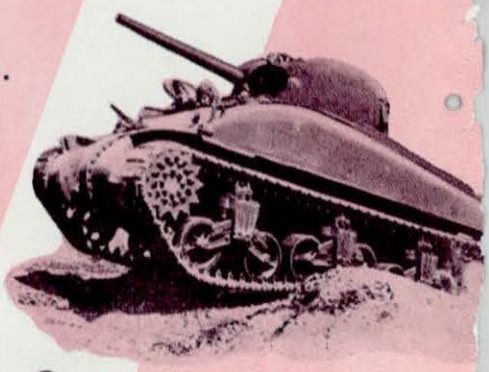
TEAMWORK

"Tain't the guns n'r armament,
nor the army as a whole,
But th' everlastin' teamwork
of ev'ry bloomin' soul."
— *Kipling*

All of General Motors' resources—its men . . . . its machines . . . . its 104 plants . . . . its Management . . . . are dedicated to producing a constantly increasing flow of war tools to "Keep 'em Rolling"—"Keep 'em Flying" —"Keep 'em Fighting". . . . because

VICTORY IS OUR BUSINESS





GENERAL MOTORS LOCOMOTIVES

ELECTRO-MOTIVE DIVISION

GENERAL MOTORS CORPORATION LA GRANGE, ILLINOIS, U.S.A.

New Deal Transportation Camouflage and Flimflam

The 43-page pamphlet published by the National Resources Planning Board summarizing its recent 500-page report on transportation recalls Kipling's lines, "If you can bear to hear the truth you've spoken, Twisted by knaves to make a trap for fools." It is the most cunningly devised and camouflaged propaganda yet issued by the New Deal in its campaign for replacing free private enterprise with Nazi-Fascist-Communist totalitarian government enterprise.

It camouflages the real objective by intelligent and fair criticism of past policies, practices and conditions affecting transportation, and by advocating government ownership of only railway tracks and terminals. But while it thus camouflages to deceive the unwary, it intentionally makes its objective so clear to all *enemies* of private enterprise that it fails to obscure it from expert and wary *friends* of private enterprise.

Its reasoning is: (1) A national income of $125 billion annually will be required to provide full employment in the post-war period. (2) To this end huge government expenditures on public works will be necessary. (3) To the same end there should be huge expenditures on railway expansion and improvements. But (4) private railway companies will be unable to finance these expenditures, especially if left at their past competitive disadvantage of having to provide their own rights-of-way, tracks and terminals while government provides corresponding facilities for other carriers. Therefore, (5) the government should acquire railway rights-of-way, tracks and terminals in order that the government may include financing of big expenditures on railways in its huge post-war public works program.

This reasoning raises some important questions that the public will require the New Dealers to answer.

The federal government *reduced* its annual expenditures $16 billion a year between 1919 and 1922, and private enterprise caused seven immediately subsequent years of prosperity in which national income became 51 per cent, or $28 billion, more in 1929 than before the first World War. Why, then, assume that continuance of huge federal government expenditures will be necessary after this war?

According to the Department of Commerce, national income in the first eight months of 1942 was at an annual rate of $105 billion. With national income at that rate, the railways made net earnings *before taxes* in those months at an annual rate of $1,683 million, or 43 per cent greater than in 1929; accrued taxes at an annual rate of $1,125 million, or almost *three times* as great as in 1929; and yet earned net operating income *after taxes* at an annual rate as large as in 1929, their best previous year. When the railways, under complete private ownership and management, actually *have done* that well this year, why assume that private railway companies could not get enough traffic and earnings to finance all their needs after this war—as they did after the last war—if (a) national income should become $125 billion, and (b) the railways' and others' war-time taxes were greatly reduced?

The federal and state governments can save the taxpayers large amounts, and abolish the competitive disadvantage of the railways, merely by *ceasing to subsidize* other carriers and by in all ways treating all carriers alike. Why, then, assume that the competitive disadvantage of the railways can be abolished *only* by the entirely revolutionary expedient of having the government use many billions of

the taxpayers' money in buying their tracks and terminals, and then later having the government spend many additional billions of the taxpayers' money in expanding and improving these facilities?

The answers to all the foregoing questions are plain enough to those who are not easily fooled by New Deal sophistry and maneuvering. The New Dealers, motivated by their Nazi-Fascist-Communist lust for power, are determined to plan and run the nation's post-war economy. To carry out their program, it is above all other things essential that they shall secure government ownership and operation of railways, because this would give them more direct and indirect power over all industries than any other single policy that could be adopted.

But, with some exceptions, they fear the effect on public sentiment regarding their broader program of totalitarianism that would be produced by frank and outright advocacy of government railway ownership and operation. Therefore, they camouflage by proposing government ownership of only tracks and terminals, while themselves justifiably sure that public acceptance of this proposal would inevitably mean full government ownership and operation.

Cunning, persevering and persuasive plotters—these New Dealers. Like a once widely advertised cathartic, "they work while others sleep." In their report they significantly ignore the most important *fact* in all American transportation history—viz., the record of efficiency, military and civilian service and earnings that the railways have made in spite of all government-created obstacles during the last two years. This is a record never remotely approached by any government planned and directed agency or industry in this or any other country during the present war or at any other time. And it has been and will continue to be fully and perseveringly presented to the public by advocates and defenders of private enterprise.

The public will not have before it only this record of railroad private enterprise efficiency and public service during the war. It will also have before it the government "planners'" record of wholesale extravagance and bungling before and during the war. With these two records to compare, it seems quite unlikely that the public will let itself be finessed, flimflammed and bamboozled by the New Dealers into government railway ownership and operation as necessary to its post-war salvation.

The recent election returns didn't forecast any such outcome.

Crisis in Crossties

A situation is developing in crosstie production that demonstrates the danger of attempting to supplant long-established practices in a highly specialized industry with a general procedure drafted for application to industry at large. It is growing out of the attempt of the Office of Price Administration to bring the production of crossties for the railways under its program of price control.

Shortly after its General Maximum Price Regulation became effective on May 11, the O. P. A. recognized that these regulations were not applicable to crosstie production, and initiated discussions with producers which led to the issuance of Regulation No. 216 freezing the prices which railways may pay for crossties on the basis of those prevailing in March, 1942. It was provided that railroads which could not secure ties at these prices could request permission to increase them, and most of the railroads have filed such requests. The O. P. A. has acted as yet, however, on only a few isolated requests, and the railways as a whole are vainly trying to secure their requirements. Production has declined as much as 65 per cent in recent weeks in areas of largest production. The situation is accentuated by widespread loss of labor from the woods to the armed forces and defense industries, and by the curtailment of truck transportation of ties from the woods to railway sidings.

The remedy involves recognition of the fact that the crosstie market differs from those for other commodities in that there are only two buyers—the railroads and the government—and government purchases have now receded to low levels. There is not, therefore, the possibility of inflationary effects as in cases of other commodities with many outlets. In fact, the O. P. A. has stated that its investigations have failed to reveal any inflationary tendencies in railway tie purchases.

Facing these facts, the demonstrated difficulty of devising any control that will work in such a highly specialized industry, and the further fact that continuation of present conditions will cause certain trouble for the railways, it would seem that no conflict with government objectives would result from the withdrawal of these restrictions and restoration to the railways of authority to purchase ties in the customary manner and from their normal sources of supply, and to adjust their prices as necessary to enable them to develop production adequate to meet their necessities. If the O. P. A. desires to insure that such procedure will not be abused, it could police purchases by requiring that copies of all tie purchase contracts be filed with it so that it could require the adjustment or cancellation of any contract that it might find to be out of line. Such a plan would require no large organization, would enable the O. P. A. to exercise such control as conditions might reveal to be necessary, and would leave the responsibility for tie supply in the channels which have heretofore proved efficient.

An adequate regular flow of crossties from the woods

into the seasoning yards and treating plants, and thence into the tracks, is essential to the functioning of the railways in the war effort. The need for removal of the difficulties that now prevail warrants the serious attention of the managements of individual railways, of the Association of American Railroads and of the Office of Defense Transportation, as well as of the Office of Price Administration, in order that production of crossties commensurate with the needs of the railways may again be resumed.

Union Journalism

"Publicity Splurge Is Planned by Rails"—such is the characteristic class-war caption placed by the paper "Labor" on its report of the co-ordinated program of advertising being undertaken by the Eastern railroads, as outlined in the *Railway Age* of October 31, page 708. The tone of "Labor's" interpretation of this news is scornful and disparaging; it ends with the observation that advertising expenses are deductible from income taxes "and thus Uncle Sam can be forced to pay a part of the bill."

Publicizing of competitive services is "out" for the duration, and the carriers are using their advertising space, instead, to promote better public understanding of the transportation situation. A "splurge" would be impossible because, despite the impression that "Labor" conveys, Treasury rulings do not permit exceptional ratios of advertising expenses to be deducted from income taxes.

The improved understanding of transportation conditions being promoted by the Eastern lines' program should serve two socially-useful purposes, viz., (1) securing greater co-operation on the part of all who provide and use transportation, to maximize the contribution of the nation's transportation plant to the success of the war program; (2) arousing more adequate appreciation by the public of *its interest* in providing conditions to permit continued efficient railroad service, both now and after the war.

In a country where the opinion of the man in the street is as important as it is in North America, it is impossible that wise decisions of public policy will be made when popular knowledge of basic facts is lacking regarding questions of such fundamental importance as those which arise respecting transportation. The Eastern railroads' program has no purpose except public enlightenment—and critics have the burden of proof either (1) that the advertisements are not factual, or (2) that it is a bad thing for the public to be given the facts. If "Labor" wishes to attempt to sustain either of these conventions, it is entirely welcome to the task.

There is no class of citizens who stand to benefit more largely or more directly from the advertising program the Eastern roads have undertaken than railroad employees. Because of the spectacular aspects of air transportation and the "public works" opportunities in connection with highway transportation, there is grave reason to fear that—after the war—the railroads may suffer seriously from lack of popular appreciation of their relative importance in the over-all national transportation picture. If that happens, railroad traffic and employment must unjustly suffer. Such loss to the railroads would be contrary to the public interest—and especially contrary to the particular interest of railway employees.

To the extent that such a condition may be avoided or mitigated by reasonable expenditures for wholly-factual advertising, railroad managements would be remiss in their duty should they refrain from making the effort so to circumvent it.

Railroad employees themselves are not inimical to legitimate effort for the protection of the source of their livelihood. Why should the writers whom they have hired, perhaps unwillingly, to keep them informed persist in misconstruing and "class-angling" news to the employees' detriment?

It would be interesting, and probably enlightening, to know the sources of inspiration of some of these union journalists—to whom they go for their ideas, their "slants," and their instructions.

Correction

In an editorial entitled "Gambling With Transportation" in *Railway Age* of November 28, page 867, mention was made of "six months' authorizations (by the War Production Board) of 100 Diesel switchers and 20,000 freight cars, and *first-quarter* authorizations (by the War Production Board) of 480,000 tons of rail, 288,000 tons of track accessories, and 330,000 tons of materials for equipment repairs."

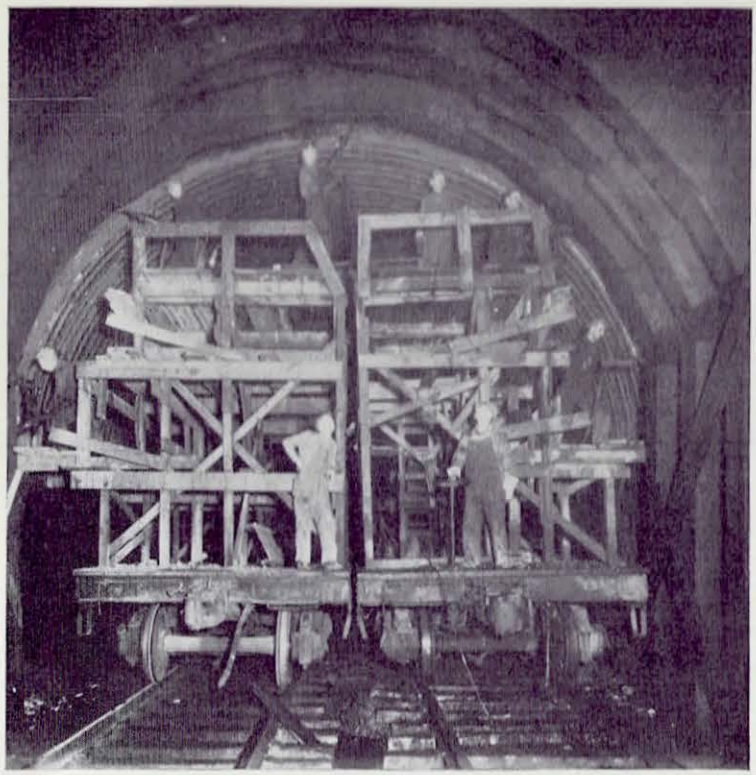
The following comment was made: "If the authorizations of rail and materials are only *half* those to be made for next year, not much reasonable complaint can be made about them, excepting that they come so late."

The authorizations of rail and materials, as correctly stated in the sentence first quoted, were only for the *first quarter* of 1943; and the comment regarding them should have been, and was intended to be, based upon that fact. The use in this connection of the words "only half" instead of "only one-fourth" was an inadvertence, and misleading.

It seemed to imply a belief, for example, that the railways could get along in 1943 with 960,000 tons of rail, whereas, as stated in the same editorial, they had asked for 2,100,000 tons.

The views of this paper regarding the rail situation had been previously stated in an editorial in its issue of October 3, 1942, in which it was shown that in the years 1926-1928 the average amount of rail actually purchased and laid annually was 2,200,000 tons.

No Delays



Showing the Concrete Chipping Work In Progress, In Preparation for Applying a Ring of the Metal Plates. Note That Only A Short Section of the Old Concrete Lining Is Exposed Between the New Metal Lining and the Timber Shoring

WAR-time traffic is continuing to move through an important double-track main-line tunnel on the Pittsburgh & West Virginia with a minimum of interruption, even though a section of the tunnel lining, which had showed evidences of total failure, is now being subjected to major repairs. This is being accomplished by lining the failed section of the arch with metal tunnel liner plates, consisting of curved sections bolted together, which are so formed that, when given a bearing on the bench walls, they develop sufficient strength to carry the arch load. When the present phase of the repair work has been completed, a section of the tunnel about 300 ft. long will have been fitted with the liner plates.

The tunnel in which these repairs are being made, known as the Greentree tunnel, is 4,716 ft. long and is located at Pittsburgh, Pa., on the main line of the railroad between Pittsburgh Junction, Ohio, on the west, and Connellsville, Pa., on the east. For most of its length it extends through shale and sandstone formations and, as completed in 1904, it was lined at the east end with brick and at the west end with concrete, with the intermediate portion, about 1,500 ft. long, lined with timber. Two years later this intermediate section was given a concrete lining.

Coal Mine Causes Trouble

The recent difficulties that have been encountered in the tunnel are attributed to the presence in this vicinity of the Pittsburgh seam of coal which, slanting downward on an angle from the east, intersects the tunnel at a location somewhat to the west of its midpoint. This coal seam, six feet thick, had been partly mined prior to the construction of the tunnel and, in line with customary practice, pillars of coal had been allowed to remain at intervals to prevent cave-ins. However, in recent years these supporting pillars had been removed by irresponsible persons, and cave-ins have occurred.

On January 30, 1941, the section foreman in charge of the tunnel reported that at one point water was coming through the lining under considerable pressure, that extensive cracks were appearing in the arch, and that the concrete was scaling off. On the following day conditions became worse, with the cracking of the concrete being clearly audible, and there were indications that considerable movement was taking place behind the lining. This trouble was experienced throughout a distance of about 100 ft. at a point about 2,200 ft. from the east portal. At this location the floor of the coal mine is located only about 15 ft. above the crown of the tunnel arch. Investigation showed that the roof of the coal mine had fallen and that the impact had ruptured the rock formation that formed the floor, causing the weight of the "fall," together with the 15-ft. thickness of rock, to be imposed on the tunnel lining.

Temporary Timber Shoring

Since it was evident that the concrete arch in the affected section was in imminent danger of collapse, steps were taken immediately to provide a temporary support to hold the lining in place pending the making of permanent repairs. This temporary support consisted of timber shoring embodying 12-in. by 12-in. posts along the walls, with sills and caps of the same size, supporting timber arch segments, spaced 4 ft. apart, each of which was built up of sections of 12-in. by 12-in. material. These arch rings were lagged with 3-in. by 10-in. planks. When the shoring had been placed, the clearances in the tunnel were not sufficient to permit double-track operation. For this reason the tunnel was converted to single-track operation, using the westbound track which was lined over two feet toward the tunnel center line at the location of the timber shoring. Although this meant that the eastbound track had to be taken out of service while the timber shoring remained in place, this track was available for use by equipment employed in making the repairs.

With the tunnel arch in the failed section supported

to War Traffic
On This Tunnel Repair Job

Problem of restoration presented by failure of 300-ft. section of concrete lining simplified by installing liner plates

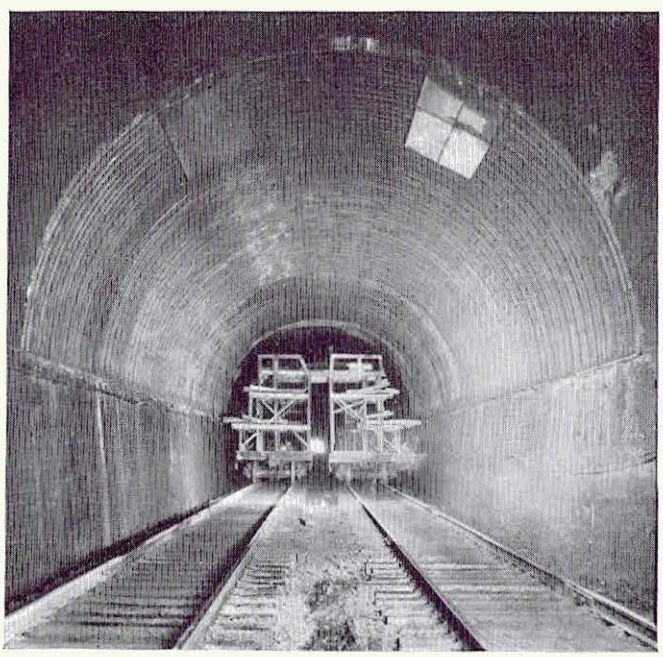
by the timber shoring, consideration was next given to the problem of devising a method of repairing the lining that would permit the work to be done with safety and with the least interference with traffic, which was increasing rapidly. The possibility of replacing the existing lining in the arch with brick or concrete construction was considered, but this was deemed impracticable because the falsework that would have been required would have interfered with the movement of traffic through the tunnel. Another objection to this method was the fact that the tunnel arch was so weakened that only short sections of the shoring could be removed at any one time for construction purposes. Hence, the procedure involved would have been complicated and costly.

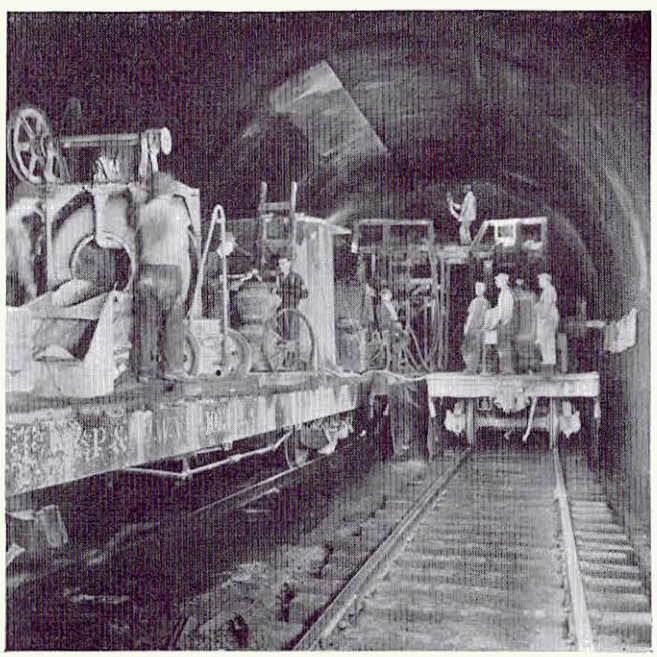
Metal Liner Plates Chosen

The railroad then investigated the potentialities of Armco heavy-duty tunnel liner plates. These plates, especially designed for such applications, are so formed to the desired curvature that they can be bolted together to form a lining to fit any tunnel section. In order that the plates will develop the necessary strength for such installations, they are each formed into a series of channels running longitudinally with the section, and, when assembled, the plates are so arranged that the channels are circumferential. Flanges along the edges of the plates permit adjacent sections to be bolted together; where the ends of adjacent sections come together, the joints are of the lap type and are also bolted.

Because these plates can be erected in rings without staging or falsework, the railroad concluded that they provided the answer to its problem in the Greentree tunnel, and it decided, therefore, to install an arch ring of the plates throughout the length of the failed section, which was 99 ft. The plates used are of seven-gage metal ($\frac{3}{16}$-in. thick) and have a channelized section 2 in. in depth. In dimensions, the standard sections are 18 in. wide and 60 in. long, and, hence, they can be assembled in 18-in. rings. The work of installing the liner plates in the 99-ft. section was undertaken in March, 1941, and was completed in October of that year.

In March, 1942, an additional section of the old lining





Left—In This View, A Section of the Newly-Placed Liner Plates Has Been Covered With Wire Mesh In Preparation for Applying the Shotcrete. Right—Applying Shotcrete to a Section of the Metal Liner Plates

about 200 ft. long, immediately adjacent to the section of metal lining, developed the same signs of failure that had been noted in the section that failed originally. As in the previous instance, the weakened arch was shored up temporarily with the timber construction, of which a length of 159 ft. was installed, and the tunnel was again converted to single-track operation. The work of installing tunnel liner plates in this section was undertaken on July 6, and it is expected that it will be completed in January, 1943. In this latest work the liner plates are being installed in a 200-ft. length of the tunnel; hence, when this section is completed there will be a continuous stretch of the tunnel 299 ft. long that will be equipped with the liner plates.

Procedure Followed

In making the present installation of the liner plates, the procedure, which is identical with that followed in the initial work, is to do the work in short sections so that a minimum of the weakened lining will remain unsupported, either by the liner plates or the temporary timber construction, at any given time. Specifically, the general practice is to remove only one segment of the timber shoring at a time and to install the liner plates in this section before removing another segment of the shoring to repeat the procedure.

When a segment of the timber shoring has been removed, the next step, using pneumatic paving breakers, is to cut back the old lining as necessary to provide suitable supporting shelves for the lower edges of the liner-plate rings at the tops of the bench walls. Elsewhere in the arch, the old lining is cut back as necessary to accommodate the liner plates and also to remove any cracked or otherwise weakened portions of the concrete lining. In the present work the base, or springing line, of the metal arch ring is being established at a level about three feet above that of the original installation. This means that the amount of chipping work has been considerably reduced, with the result that, since this is a time-consuming operation, it is possible to carry the work forward at a faster rate than had been possible when making the initial installation.

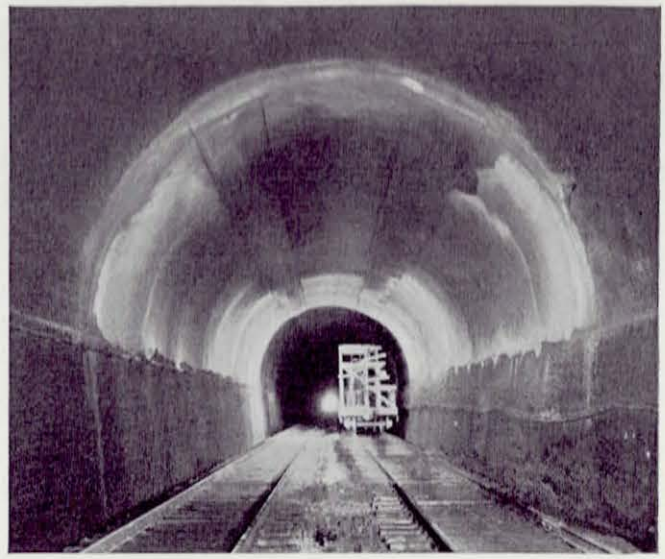
Installing the Liner Plates

When the concrete chipping work has been completed for a given section, the next step is to install the liner plates. These are partially assembled outside the tunnel in such a manner that each arch ring of the 18-in. plates is brought into the tunnel in two parts, which are installed simply by setting them into position and bolting them together and to the adjacent ring. To waterproof the joints in the liner plates, they are packed with burlap saturated with asphalt. At the points where the liner-plate rings bear on the shelves in the bench walls, they are provided with base plates, which are welded to the liner plates. One-inch anchor bolts extend through the base plates into the concrete of the bench walls.

When the liner plates have been installed, grout is applied through them under pressure to fill the voids between the plates and the concrete, as well as any cracks in the concrete. To facilitate the grouting work three 2-in. grout holes, complete with couplings and plugs, are provided in every fourth arch ring. Before grouting any section of the plate lining, it is necessary to seal the opening between the edge of the end arch ring and the face of the old concrete. In the beginning an attempt was made to do this with a length of three-inch fire hose which was inserted in the opening and then inflated with compressed air. However, because of irregularities in the surface of the concrete, this expedient did not prove successful. The practice is now to seal this opening with concrete.

Shotcrete Applied

After the liner plates have been installed and grouted, a protective coating of shotcrete, reinforced with wire mesh, and having a minimum thickness of two inches, is



This Is a View of the Initial 99-Ft. Section of Liner Plates, Showing the Protective Coating of Shotcrete and the Lines of Blast Plates Over the Tracks

applied over them. At times it has happened that the presence of water on the surface of the metal lining has made it impractical to apply the standard shotcrete mix because the water would tend to soften it and prevent the initial set. This difficulty was overcome by using an admixture in the shotcrete, so proportioned as to cause it to attain an initial set in 5 to 10 sec. after application. Incidentally, the back faces of the liner plates were covered with an asphaltic protective coating, but in the interests of securing a good bond between the shotcrete and the metal, the outer surfaces were not so treated.

To protect the shotcrete from the abrasive action of locomotive blasts a line of Armco blast plates was applied to the tunnel arch over each track in the section where the liner plates were installed initially and over the westbound track only in the second section, this being the direction of the ascending movement. These plates are asbestos bonded on both sides. The plates over each track consist of two lines of 2-ft. by 6-ft. plates, placed side by side with the long dimension parallel with the tunnel. They are flanged on all four sides and are hung from the arch by means of the joint bolts in the liner plates. The blast plates are fastened in position before the shotcrete is put on, and, in applying the latter, care is taken to insure that a coating of the specified thickness is obtained on those areas of the metal lining behind the blast plates.

All work involved in applying the liner plates is carried out from five flat cars which, in addition to scaffolding, carry all the equipment and materials necessary to permit the work to proceed as a continuous operation. Scaffolding is provided on four of these cars and is so designed that when the cars are placed side by side, two

(*Continued on page 918*)

Will Railroad Traffic of the Future Require Steam or Diesel?*

A presentation of the many factors involved in motive power selection and operating costs related thereto

By L. K. Sillcox,

First Vice President, New York Air Brake Company

THE Diesel-electric locomotive has effectively challenged the steam locomotive. True, during the early years of the present century, electrification was introduced and many authorities predicted that the electric locomotive would eventually displace steam power as traffic volume continued to mount. Events of the last few years clearly indicate this not to be so except in relatively few instances. The use of electric locomotives anticipates the provision of power houses and power lines, feeder lines and trollies to meet maximum demands. The effect of this principle makes it impossible to transfer such facilities, or even the locomotives themselves, to points where demands of fluid traffic may require. Electric traction is preferred by many in heavy traffic zones but the Diesel-electric displays identical operating characteristics to the electric locomotive except that its maximum capacity is limited to that of a portable power plant. The line of demarcation between the operating and economic conditions which could be better satisfied by the electric or steam locomotive is more plainly marked than between Diesel-electric and steam power. The case for steam power in sparsely populated territory of easy grades, for example, was very strong. On the other hand, electrification faced no opponents in terminal areas where steam power was excluded by municipal ordinance. This is not true of the Diesel-electric versus steam controversy except in cases where steam is prohibited by legislation. There are many borderline cases and personal preferences. The wide original cost advantage which the steam locomotive has enjoyed over its Diesel-electric counterpart is constantly being narrowed as the cost of steam power increases with refinements designed to increase operating efficiency, and Diesel costs are reduced through standardization and mass production methods. Neither excels to the point of total exclusion of the other. The result is that the evaluation of their merits for a given assignment is more difficult and entails a most exacting study before a logical selection may be made. The Diesel-electric locomotive is an effective compromise between electrification and steam power.

Table I—Comparison of Freight Locomotive Data—1925 and 1940—Norfolk and Western Railway

Account	Years 1925	Years 1940	Change, Per Cent + Increase − Decrease
Gross earnings	$105,218,991	$105,228,621	+0.009
Net earnings	26,565,292	31,383,976	+18
Gross ton-miles (thousands) (excl. loco. and tender)	27,037,267	30,178,450	+12
No. loco's. used	653	347	−47
Avg. tractive force—Lb.	60,653	88,947	+47
Gross ton-miles per frt. train-mile (excl. loco. and tender)	2,613	3,805	+46
Avg. speed—train-miles per train-hour	12.3	15.4	+25
Gross ton-miles per train-hour (excl. loco. and tender)	32,212	57,984	+80
Lb. coal per 1,000 gross ton-miles (inc. loco. and tender)	147	89	−39
No. loco. failures	388	74	−81
Miles per failure	34,892	114,970	+230
Cost of loco. repairs per million tractive-force lb.-miles	$7.35	$4.99	−32

Table II—Displacement Ratio of Steam and Diesel Locomotives

No. of Steam Locomotives	No. of Diesel Locomotives	Ratio—Steam to Diesel
7	5	1.40*
17	12	1.42
32	23	1.39
8	6	1.33
1	1	1.00

* Calculated—based upon availabilities of 68 and 95 per cent for steam and Diesel power, respectively.

Capital Investment

Because of the more favorable availability characteristics of the Diesel, where it is utilized, a given traffic volume may be moved with a smaller motive power inventory, thereby requiring less capital investment if first costs were comparable. However, the original cost of a Diesel-electric unit is greater than that of its steam competitor, so no clear gain is indicated by the substitution of a reduced number of Diesels for steam power. Steady progress in design and production methods, partially effected by increased production volume, has gradually reduced the initial cost of Diesel locomotives to approximately $87.50 per hp. as contrasted with approximately $35.00 per hp. cost for steam power. Partially offsetting this decided cost advantage of the steam locomotive is the higher availability, and resulting more intensive utilization, possible with Diesel power. The average mileage figures for the competitive types in passenger service are as follows:

Type	Average Annual Mileage	Maximum Monthly Mileage
Diesel-electric	250,000	27,000
Steam	180,000	18,000

In other words, 18 Diesel-electric units will replace 25 steam locomotives of comparable capacity. If the assignment were such that either of the two locomotives whose horsepower characteristics are presented in Fig. 1 could be selected, the 18 Diesel-powered units would require a capital investment more than two and one-half

* Abstract of a paper prepared for presentation before The Institution of Locomotive Engineers, London, England.

million dollars greater than would the 25 steam-powered units. Lacking experience data, the life of a Diesel locomotive is a matter of conjecture but it has been tentatively estimated to be 15 years, a value that may be revised upward as experience accumulates. Contrasted is the widely accepted service life of a steam locomotive of

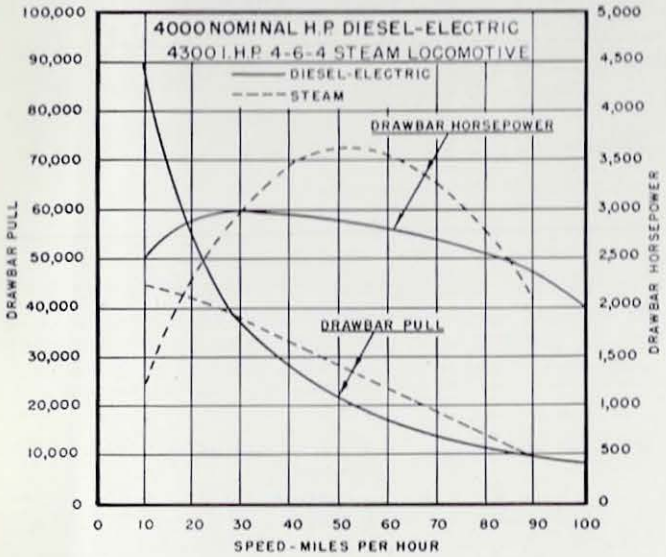


Fig. 1—Comparative Drawbar Horsepower and Drawbar-Pull Curves—Steam vs. Diesel-Electric Locomotives

28 years. Annual depreciation charges per installed horsepower are, then, $1.25 and $5.83 for the steam and Diesel types. For the above locomotives, annual depreciation would reach $23,333 for the Diesel while but $5,375 would be charged against the steam unit. Competition has encouraged steam locomotive improvements which have forced upward the purchase price while the introduction of mass production methods and adherence to standardization have enabled the Diesel-electric manufacturers to lower their prices. Ten years ago the ratio favoring steam power was four to one, while today it is but two and one-half to one and there is no evidence to indicate that the trend will not continue. Actual initial cost data submitted by one railway is representative of the gains accruing to the Diesel in this account. In 1937, this railway purchased a series of steam locomotives with a 4-8-4 wheel arrangement for which the cost was 25 dollars per hp. Two years later, an order placed for a series, basically similar in design but differing somewhat in details, was billed at a charge of 30 dollars per hp. In 1941, locomotives of the 4-8-8-4 wheel arrangement cost 35 dollars per hp., indicating that the unit cost of steam power is steadily increasing. On the other hand, in 1937 a 5,400-hp. Diesel-electric unit cost the purchaser $104.00 per hp., while in 1941 a similar locomotive developing 6,000 hp. could be obtained at a 90 dollar unit cost.

Depreciation or Obsolescence?

Depreciation rates cannot be determined with strict confidence; for lack of experience data concerning the Diesel, and there is still controversy relative to steam locomotive life, even after over 100 years of accumulated experience. Reference to any railway equipment classification register doubtless will disclose steam locomotive ages of 15 years, 25 years, and even 50 years, although, in the latter case, probably no part of the original locomotive remains, aside from the number. Locomotive components are often replaced a part at a time to perpetuate the machine and this practice is the basis for the "no depreciation account" which has been advocated in some quarters. At first thought, one might be inclined to agree with this extreme view but it is not difficult to discern the fallacy involved, although possibly the term obsolescence should be substituted for depreciation. By proper maintenance, a steam locomotive can be maintained in such degree of mechanical efficiency as to be judged satisfactory when viewed in the light of efficiency standards obtaining at the time of its manufacture and the unit would not have been depreciated to the scrap pile. But advances may be accomplished in locomotive design or, just as important, operating demands may be increased to such extent as to render the locomotive economically unjustified and it is scrapped because of obsolescence.

Water Costs and Consumption

The Diesel-electric, burdened by a disproportionate initial cost, and consequent fixed charges, offers compensating advantages. An example is the lower water costs incurred in the utilization of Diesel power. Water costs as applicable to the steam locomotive are often ten per cent of the fuel charge, a very appreciable item of expense. If a Diesel locomotive is substituted in the same service, this charge will be reduced from ten to one per cent of steam locomotive fuel costs, if it be passenger service where steam generators are utilized for heating or air conditioning, and to a negligible value in freight service where no auxiliary power plant is required. It is difficult to overemphasize the importance of this re-

Table III—Hourly Switching Locomotive Costs

	Steam	Diesel	Diesel Saving
Railway A—600 h.p. Diesels			
Fuel	$0.801	$0.224	$0.577
Water and other supplies	0.165	0.005	0.160
Lubricants	0.026	0.040	−0.014
Enginehouse expense	0.393	0.038	0.355
Repairs	0.950	0.277	0.673
Total	$2.335	$0.584	$1.751
Railway B—600 and 1,000 h.p. Diesels			
Fuel	$1.12	$0.37	$0.75
Water, lubricants and other supplies	0.20	0.08	0.12
Enginehouse expense	0.47	0.04	0.43
Repairs	1.31	0.43	0.88
Total	$3.10	$0.92	$2.18
Railway C—1,000 h.p. Diesels			
Fuel	$1.0636	$0.3267	$0.7369
Water, lubricants and other supplies	0.1111	0.0254	0.0857
Enginehouse expense	0.2279	0.0427	0.1852
Repairs	1.0633	0.5500	0.5133
Total	$2.4659	$0.9448	$1.5211
Railway B—600 and 1,000 h.p. Diesels			
Fuel	$1.12	$0.37	$0.75
Water, lubrication and other supplies	0.20	0.08	0.12
Enginehouse expense	0.47	0.04	0.43
Repairs	1.31	0.43	0.88
Wages of enginemen	1.82	1.91	−0.09
Depreciation	0.23	0.55	−0.32
Total	$5.15	$3.38	$1.77
Railway C—1,000 h.p. Diesels			
Fuel	$1.0636	$0.3267	$0.7369
Water, lubrication and other supplies	0.1111	0.0254	0.0857
Enginehouse expense	0.2279	0.0427	0.1852
Repairs	1.0633	0.5500	0.5133
Wages of enginemen	1.7813	1.7513	0.0300
Depreciation	0.1319	0.4157	−0.2838
Total	$4.3791	$3.1118	$1.2673

To this can be added a comparison of total costs per hour, less taxes, insurance, and interest, based upon the operations of Railways B and C.

duction in water consumption, especially in operating districts where water of proper characteristics or in suitable quantities is not available. Railways operating steam locomotives in such territory resort to the use of auxiliary water cars, thereby increasing costs to a marked degree, in addition to curtailing revenue loading by an

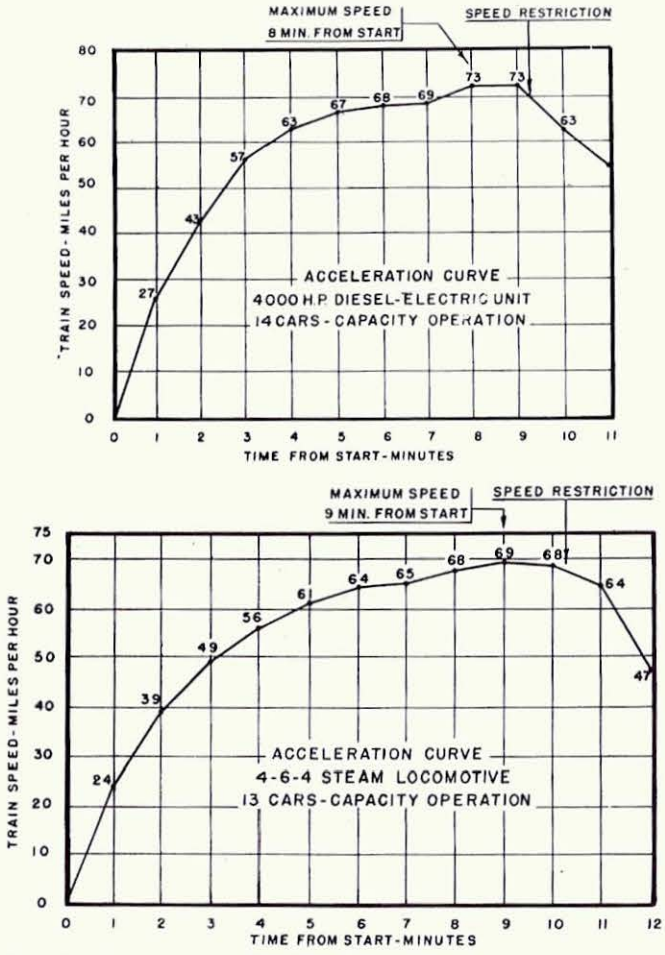


Fig. 2—Comparative Acceleration Curves—Capacity Operation—Steam vs. Diesel-Electric Locomotives

amount equivalent to the weight of water car and contents. Diesel power eliminates the necessity for chemically treating large volumes of boiler feed water. Inactive time required for boiler washing, testing, and repair, inherent in the steam locomotive, is not suffered when Diesel-electric power is employed and a higher availability results, a factor in reducing the number of units necessary for a given assignment.

Diesel Flexibility

The greater flexibility of the Diesel locomotive is another attractive characteristic which this power type displays. Since it is possible to operate such units singly, or in associated groups of two or more, centrally controlled, the amount of motive power assigned to a given train can be arbitrarily changed to meet traffic demands. Moreover, during the course of a run, the various units may idle during periods when full power is not needed. While operating on level, tangent track but a portion of the total power available is required to maintain operating speed and during this period one or more units may be idling, whereas on adverse grades, or when accelerating to speed after a slow-down or stop, the full complement of power available may be employed to overcome the greater resistances encountered. During low-demand periods, the various units may be alternately released for inspection and any light service repairs deemed necessary. Thus, maintenance may be accomplished en route with a consequent reduction in terminal delay; affording, at the same time, insurance against the development of defects which, if permitted to persist, may lead to damage

Table IV—Freight Locomotive Operating Data

	Steam	Diesel	Diesel Saving
Mileage	455,216	216,725	.....
Availability—per cent	75	90	.....
Utilization—per cent	36	62	.....
Car miles per train-mile	82.5	89.3	.....
Gross ton-miles per tr.-mi.	3,400	3,801	.....
Gross ton-miles per tr.-hr.	92,303	107,940	.....
Train-miles per hour	27.15	28.39	.....
Average number loco. in service	10	3	.....
Average cost per loco.	$174,000	$490,000	.....
Date built	1938	1941	.....
Per Mile Costs			
Repairs	$0.30	$0.23	$0.07
Depreciation	0.08	0.20	−0.12
Fuel	0.33	0.28	0.05
Lubricants	0.01	0.05	−0.04
Water and other supplies	0.05	0.002	0.048
Enginehouse expense	0.04	0.01	0.03
Wages of enginemen	0.18	0.15	0.03
Total cost per loco.-mile	$0.99	$0.922	$0.068
Total cost per thousand gross-ton miles	$0.2908	$0.2254	$0.0654

of serious proportions entailing delay in terminals awaiting repairs at a high expense penalty.

When a complete failure of a steam locomotive occurs, the train is helpless until an additional locomotive is despatched to bring the train in. Rarely does a multiple unit Diesel locomotive fail completely. The delay is only that arising from the reduction in operating speed caused by insufficient power. The steam locomotive is at a distinct disadvantage because of its inability to present this same characteristic of flexibility.

Lateral Thrust Versus Dynamic Augment

Engineering officers, while realizing the importance of the lateral thrust developed with the swivel trucks used on Diesel motive power in conjunction with high concen-

Table V—Passenger Locomotive Operating Data (January to October, 1941, inclusive)

	Steam	Diesel	Diesel Saving
Mileage	2,212,872	1,813,522	.....
Availability—per cent	75	90	.....
Utilization—per cent	53	90	.....
Average number of locomotives in service	17	7	.....
Average cost per locomotive	$179,000	$365,000	.....
Date built	1938	1936-1941	.....
Per Mile Costs			
Repairs	$0.19	$0.16	$0.03
Depreciation	0.04	0.10	−0.06
Fuel	0.17	0.10	0.07
Lubricants	0.02	0.02	.....
Water and other supplies	0.02	0.008	0.012
Enginehouse expense	0.02	0.012	0.008
Wages of enginemen	0.15	0.12	0.03
Total cost per locomotive-mile	$0.61	$0.52	$0.09

trated loads on small wheels, nevertheless praise the Diesel-electric for its lack of overbalance, inherent in the conventional reciprocating steam locomotive. Differences of opinion obtain with regard to track effects in the case of locomotives having low centers of gravity such as the Diesel-electric or of the dynamic augment produced by the overbalance in the steam locomotive.

The dynamic augment varies with the square of the speed and produces serious limitations to steam power in the high-speed zone. If a locomotive encounters a section of poor rail, in so far as adhesive condition is concerned when it is being operated near capacity, driving wheel slipping may occur, thus developing high

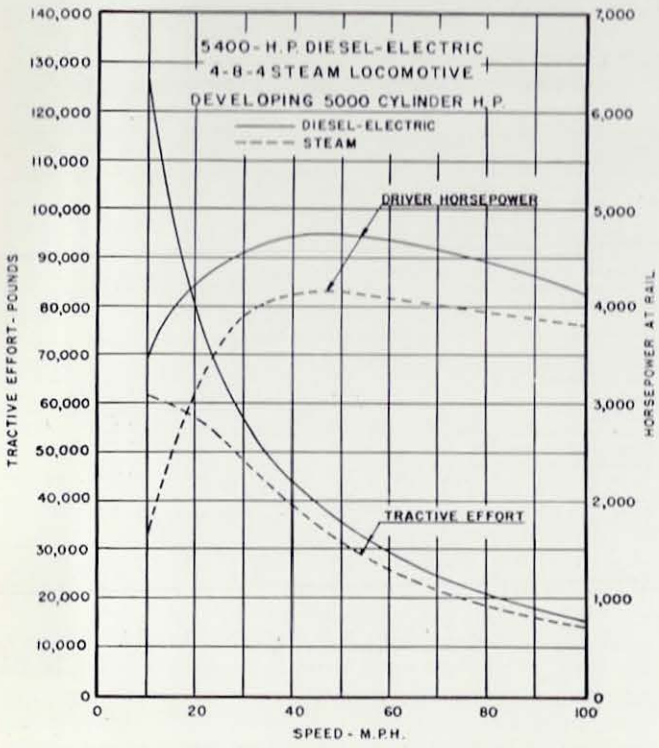


Fig. 3—Comparative Driver Horsepower and Tractive Force Curves—Steam vs. Diesel-Electric Locomotives

rotative speed in consequence of which elevated track stresses result.

Efforts to improve this condition have included the reduction in weight of reciprocating parts by the substitution of lightweight, high-tensile, alloy steels. By increasing the number of cylinders to four, thereby providing two sets of reciprocating motion, as has been done in articulated designs, unit reciprocating weights have been reduced and the condition improved. The trend toward ever larger locomotives has been reflected in massive reciprocating parts and has, therefore, increased the difficulties suffered from dynamic augment. The articulated design replaces the large engine by a multiplicity of smaller ones to do the same work. One locomotive has been constructed in which complete freedom from overbalance has been obtained by employing individual axle drive. If maintenance and other operative characteristics prove satisfactory, this design offers possibilities for high-speed operation.

Steam Locomotive Performance

A striking example of what can be accomplished when all components affecting operating results are intelligently administered and energetically policed is that of the Norfolk & Western. In 1925 the N. & W. handled 27 billion gross ton miles with 653 road locomotives while, in 1940, this same road handled 30 billion gross ton miles with 347 road locomotives. In 1925 gross ton miles per train hour were 32,212 but by 1940 this figure had increased to 57,984. The improved boiler efficiency is demonstrated by the reduction in unit fuel consumption. The coal consumed per thousand gross ton miles decreased from 147 lb. in 1925 to 89 in 1940. Improved dependability is evidenced by the reduction of freight locomotive failures from 388 to 74. At the same time, miles per freight locomotive failure more than tripled. Many have maintained that the added refinements and auxiliaries built into modern steam power would measurably increase maintenance costs. This is not true in the case of the Norfolk & Western. On the basis of 1,000 gross ton miles, the maintenance costs in 1925 was 31.2 cents, while in 1940 it was 16 cents. The cumulative effect of these savings is reflected in the net earnings account where an 18 per cent increase is indicated with gross earnings for the two years remaining unchanged. The detailed statistics are shown in Table I.

[NOTE—Reference was made to the drawbar pull-horsepower curve of the N. & W. 2-6-6-4 locomotive with the comment that this design has contributed much to the foregoing record. This locomotive was described in the October, 1936, Railway Mechanical Engineer, page 421.—EDITOR.]

Fig. 2 presents a comparison of the performance of a steam locomotive of 4-6-4 wheel arrangement and a 4,000-hp. Diesel-electric unit when operating over the same territory. These two locomotives are assigned to identical services and produce approximately the same amount of effort during the course of a run, the exception being that, when necessary, the Diesel-electric can maintain on-time performance with a heavier train.

It might be argued by steam power proponents that this is not a true comparison and that other steam locomotives of the same wheel arrangement can surpass the capacity exhibited by the Diesel-electric unit. The reply in this case is that each of the locomotives is of the most modern design and the characteristics installed were selected as the best obtainable with the power type for the service to which they are assigned.

Comparative driver horsepower and tractive force curves are presented in Fig. 3 of a steam locomotive which develops, at a maximum, 5,000 cylinder hp. and of a Diesel-electric rated at 5,400 hp. These curves may be compared with those of the two motive power types as illustrated in Fig. 1. It will be noted that, in Fig. 1, the plotted values are taken at the drawbar, hence the effect of the difference in weight of the two units is reflected through the medium of locomotive resistance. These two sets of curves demonstrate clearly the superior power characteristics of the Diesel-electric throughout the low-speed range below approximately 30 m. p. h. and at once explain the greater accelerating capacity of this motive-power type. They also provide an explanation for the improved acceleration characteristics of the Diesel as graphically presented in Fig. 2.

Table VI—Total Costs of Operating Passenger Trains

	Steam	Diesel	Total Diesel Saving
Train-miles operated	325,378	237,626	.....
Locomotive miles, including helper service and double heading	385,637	252,129	.....
Locomotive miles per train-mile	1.185	1.062	.....
Locomotive and train wages	$85,298	$65,254	$20,044
Fuel	65,775	40,162	25,613
Water, lubricants, and supplies	9,081	8,437	644
Train supplies and expenses	41,538	41,538	.....
Helper and double heading	38,054	12,713	25,341
Car repairs	38,679	38,679	.....
Locomotive repairs	90,462	49,901	40,561
Third man on Diesel	.....	8,316	–8,316
Total train	$368,887	$265,000	$103,887
Total locomotive (inc. train wages)	$288,670	$184,783	$103,887

Inasmuch as most switching operations are made in the low-speed range where the Diesel's excess tractive capacity may be utilized, the steam locomotive is at a decided competitive disadvantage. The Diesel is almost universally displacing steam power when new units are necessary or judged economical. Fig. 4 demonstrates the characteristics of six switching locomotives. For all switching speeds up to 6 m. p. h., the 1,200 hp. Diesel, Class A, delivers higher torque and thus can accelerate maximum tonnage more rapidly than can a steam locomotive of 2,100 hp. Its superiority over a steam locomotive of 1,500 hp. extends to 7 m. p. h., and in comparison with the 1,300 hp. steam locomotive, the Class A Diesel excels at all speeds up to 11 m. p. h. Since most switching operations are conducted at speeds below 6 m. p. h., the Diesel enjoys a definite advantage over its steam counterpart. Installation of the proper gear ratio between traction motor and power axle will enable a Diesel-electric switching locomotive to perform the assignments of a steam locomotive which has a horsepower rating of approximately two and one-half times that of the Diesel.

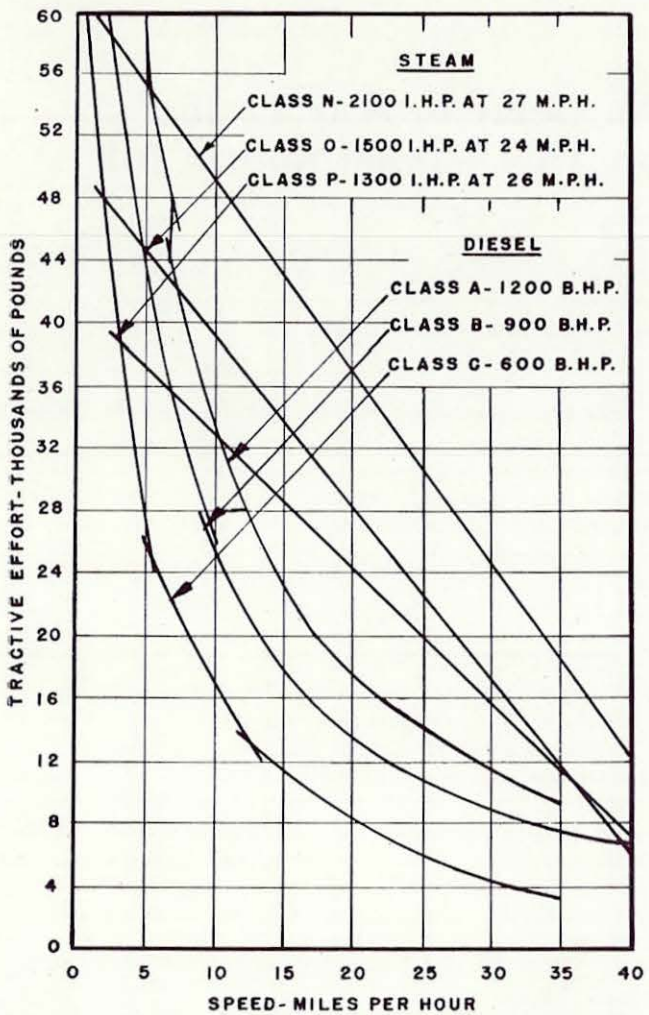


Fig. 4—Switching and Transfer Locomotive Comparisons—Steam vs. Diesel

The favorable availability of the Diesel is attained, in part, by virtue of its characteristic which permits power to be cut off or on momentarily, thus eliminating any delay prior or subsequent to a servicing or maintenance operation. Fueling of the Diesel is required but two or three times per week and offers no serious problem. General overhaul, a yearly maintenance expense, requires from 10 days to two weeks, on the average, of non-productive time, permitting a maximum availability of approximately 95 per cent. On the other hand, a steam locomotive is ordinarily assigned to no more than 16 hours continuous duty a day, it then being relieved for servicing and maintenance. It must be withdrawn from service at 30-day intervals for boiler inspection and washing. Six thousand hours per year of the 8,760 possible, an availability of approximately 68 per cent, is deemed to be as much productive time as may be obtained from a steam powered unit.

Table VII—Locomotive Expenses per Train Mile (Including train wages)

	Steam	Diesel	Diesel Saving
Locomotive and train wages	$0.262	$0.275	$–0.013
Fuel	0.202	0.169	0.033
Water, lubricants, and supplies	0.028	0.0355	–0.0075
Helper and doubleheading	0.117	0.0535	0.0635
Locomotive repairs	0.279	0.210	0.069
Third man on Diesel	.....	0.035	–0.035
Total	$0.888	$0.778	$0.110
Total train-cost per train-mile	$1.14	$1.12	$0.02
Total locomotive-cost per train-mile	0.89	0.78	0.11
Total locomotive-cost per locomotive-mile	0.75	0.735	0.015

Investment Comparison

On the basis of the foregoing representative availability values, five Diesel switchers will replace seven steam locomotives. Diesels of 600 hp. have regularly performed the yard operations of a 1,400 hp. steam design. With Diesel power costing $87.50 per hp. and steam locomotives, $35.00 per hp., capital investment for the two alternatives would be:

Diesel: Five 600-hp. units at $87.50 = 5 × 600 × 87.50 = $262,500.

Steam: Seven 1,400-hp. units at $35.00 per = 7 × 1,400 × 35 = $343,000.

This condition does not hold for road power, however, due to the higher operating speeds and the Diesel investment is invariably greater than that required for steam. Neither does it hold in yard service if motive power inventory is insufficient to support the five to seven advantage displayed by the Diesel. Table II illustrates this point.

Approximately four years ago, a committee, composed of representatives of one railway and two Diesel-electric switching locomotive manufacturers, was organized for the purpose of determining impartially the relative operating costs of steam and Diesel power in yard service. After thorough and painstaking analysis of available cost data, this committee concluded that, including fuel, lubricants, water supply, enginehouse expenses, and crew wages, the cost per hour of operating a 600-hp. Diesel switcher was $2.68 while the similar cost, if a steam locomotive were selected for the same assignment, would be $3.90, or a difference in favor of the former of $1.22. A further credit of eight cents per hour was agreed upon for savings in locomotive crew overtime and hostlers' wages, with a resulting figure favorable to the Diesel of $1.30 per hour operated. The saving of eight cents per hour labor charge is dependent upon local conditions and is, therefore, subject to considerable variation. The preceding estimate is recorded as of interest in light of actual switching locomotive costs as submitted by three railways. Unfortunately, all railways do not adhere to a uniform accounting system, a fact which must be borne in mind when comparing such data. It will be noted by reference to Table III that Diesel switching

locomotive hourly costs are less in all accounts with the exception of the relatively small lubrication expense where it is 50 per cent greater than the amount chargeable to the steam locomotive, and that the total saving per hour approximates $1.75.

A reduction in the cost advantage displayed by the Diesel is evidenced in each instance and a further reduction would be indicated if taxes, insurance, and interest were included. Even then, however, the Diesel would exhibit marked superiority and its retention in service would be economically justified. The steam freight locomotives in Table IV are of modern design, being built in 1938, and are comparable with the Diesel-electric power. The two classes of power are not, however, operated over the same territory and, because of local conditions, the steam locomotives do not handle as heavy trains as do the Diesel-electrics. The tonnage rating of the steam locomotives on a 1.27 per cent ruling grade is 3,200; of the 5,400-hp. Diesels with a 61/16 gear ratio the tonnage rating is 3,500 and, with a gear ratio of 62/15, the rating is increased to 3,800. These tonnage ratings are based upon handling trains without helper service. As of possible interest, the effect of varying the gear ratio of these Diesels on tonnage rating with a ruling grade of 2.2 per cent when operating without helper service, and on maximum speed is injected here:

Gear Ratio	Tonnage rating	Maximum speed, m.p.h.
59/18	1,700	80
61/16	2,000	70
62/15	2,300	65

The administration of the railway operating these locomotives judges a maximum speed of 65 m.p.h. to be ample for freight service and will, therefore, specify the 62/15 gear ratio on future orders so that the extra tonnage may be handled.

In analyzing the operating costs of the Diesel-electric passenger locomotive as compared with the steam locomotive, shown in Table V, allowance should be made for the fact that the Diesels are operated in high-speed service while the steam locomotives are handling heavy trains at lower rates of speed; consequently, if the steam locomotives were required to operate at the same speeds as the Diesels, even though they were handling light trains, the fuel and repair costs would increase. The passenger train and locomotive costs in Tables VI and VII were submitted by another railway as being applicable to sections of its system over which steam and Diesel-electric locomotives operate in comparable service.

Caution must be exercised when comparing the total costs and savings resulting from Diesel operation, as computed by the two railways, inasmuch as one includes a depreciation charge while the other lists expense arising from helper service, doubleheading, and the practice of maintaining a third employee on the Diesel-electric unit. Comparison can only be made between the individual accounts.

The Diesel displays unquestionable advantages for yard assignments, is peculiarly adapted to certain high-speed passenger operations, and is being installed in freight service to a limited extent. The controversy as to steam or Diesel will be finally decided on strict economic principles. Ultimate selection depends, to a large extent, upon the ability of Diesel-electric manufacturers to offer their product at a price comparable with that of the steam locomotive. Should this be accomplished, the position of steam as the motive medium would be precarious.

The substitution of Diesel power would enable the elimination of costly boiler-water preparation facilities, water-service towers or track pans and of unsightly coaling plants. It would remove the necessity for engine-house properties as we know them which could be replaced with modern, attractive maintenance plants. Diesels would operate to reduce the number of terminals required and to this extent would largely effect an overall improvement in railway operating practice, both with respect to the economy of movement and to the despatch with which tonnage is handled. *Perhaps this is the important aspect of the entire problem of railway modernization made possible through the use of the Diesel; the aspect that should be emphasized more than all others, thus eliminating excuses to stop trains in transit unnecessarily.** Further, if the practice of handling traffic in train-load lots is forced upon the railways by competitive rate situations effected through other forms of transport attempting to obtain the traffic, it merely signifies that railway traffic will represent unit movements covering great distances between originating and final terminals with no intermediate attention affecting train consist required. Railways have but one future; namely, to handle traffic at wholesale rates and to discontinue conditioning rates upon a retail basis.

No Delay to War Traffic on This Tunnel Repair Job

(*Continued from page 912*)

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Other equipment on the flat cars includes a 220-cu. yd. air compressor, a 1,500-watt engine-generator set, with a standby unit, which supplies power for lighting, and a hand-operated derrick. For removing the old concrete, four pneumatic paving breakers are used, including two 80-lb. units, one 60-lb. tool, and one weighing 54 lb. Because of the weight of these hammers, and the fact that it is frequently necessary to use them against an overhead surface, they are normally handled by means of slings. For the lighter chipping work, two 20-lb. hammers are used. The force employed on this job consists of a foreman and nine men.

When clearing the tunnel for trains, the flat cars are taken to the east portal, in which direction the tracks are on a down grade of one per cent. Considerable time is saved in this operation by "drifting" the cars on the eastbound track which, as mentioned previously, was taken out of service when the temporary timber shoring was installed. The cars on the westbound track are switched out by a worktrain locomotive. Normally, from 10 to 12 trains pass through the tunnel during working hours.

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Inasmuch as most switching operations are made in the low-speed range where the Diesel's excess tractive capacity may be utilized, the steam locomotive is at a decided competitive disadvantage. The Diesel is almost universally displacing steam power when new units are necessary or judged economical. Fig. 4 demonstrates the characteristics of six switching locomotives. For all switching speeds up to 6 m. p. h., the 1,200 hp. Diesel, Class A, delivers higher torque and thus can accelerate maximum tonnage more rapidly than can a steam locomotive of 2,100 hp. Its superiority over a steam locomotive of 1,500 hp. extends to 7 m. p. h., and in comparison with the 1,300 hp. steam locomotive, the Class A Diesel excels at all speeds up to 11 m. p. h. Since most switching operations are conducted at speeds below 6 m. p. h., the Diesel enjoys a definite advantage over its steam counterpart. Installation of the proper gear ratio between traction motor and power axle will enable a Diesel-electric switching locomotive to perform the assignments of a steam locomotive which has a horsepower rating of approximately two and one-half times that of the Diesel.

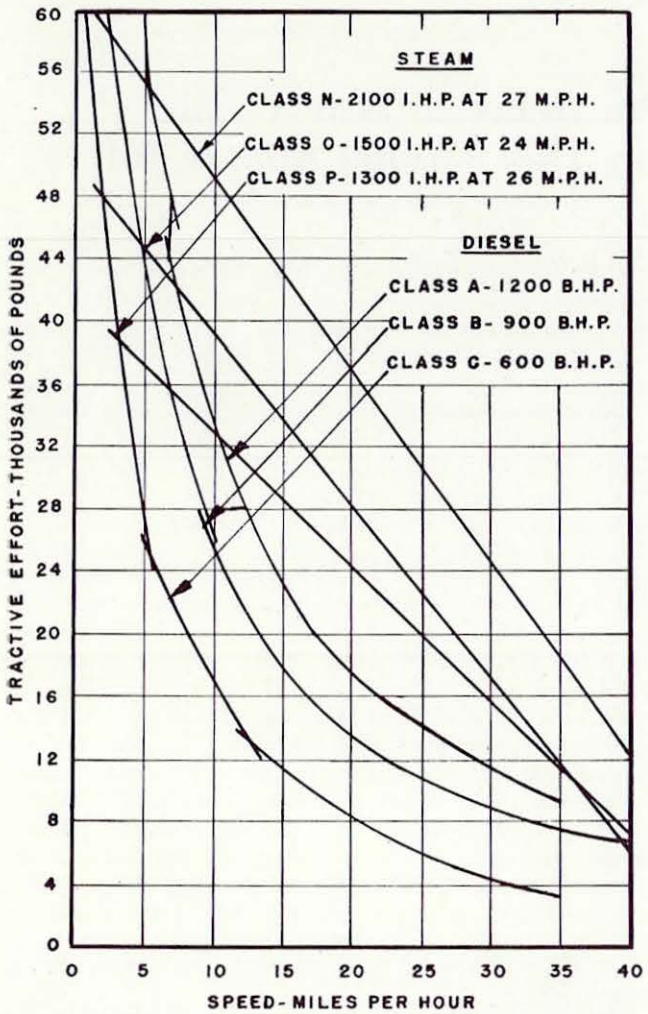

Fig. 4—Switching and Transfer Locomotive Comparisons—Steam vs. Diesel

The favorable availability of the Diesel is attained, in part, by virtue of its characteristic which permits power to be cut off or on momentarily, thus eliminating any delay prior or subsequent to a servicing or maintenance operation. Fueling of the Diesel is required but two or three times per week and offers no serious problem. General overhaul, a yearly maintenance expense, requires from 10 days to two weeks, on the average, of non-productive time, permitting a maximum availability of approximately 95 per cent. On the other hand, a steam locomotive is ordinarily assigned to no more than 16 hours continuous duty a day, it then being relieved for servicing and maintenance. It must be withdrawn from service at 30-day intervals for boiler inspection and washing. Six thousand hours per year of the 8,760 possible, an availability of approximately 68 per cent, is deemed to be as much productive time as may be obtained from a steam powered unit.

Table VII—Locomotive Expenses per Train Mile (Including train wages)

	Steam	Diesel	Diesel Saving
Locomotive and train wages	$0.262	$0.275	$–0.013
Fuel	0.202	0.169	0.033
Water, lubricants, and supplies	0.028	0.0355	–0.0075
Helper and doubleheading	0.117	0.0535	0.0635
Locomotive repairs	0.279	0.210	0.069
Third man on Diesel	.....	0.035	–0.035
Total	$0.888	$0.778	$0.110
Total train-cost per train-mile	$1.14	$1.12	$0.02
Total locomotive-cost per train-mile	0.89	0.78	0.11
Total locomotive-cost per locomotive-mile	0.75	0.735	0.015

Investment Comparison

On the basis of the foregoing representative availability values, five Diesel switchers will replace seven steam locomotives. Diesels of 600 hp. have regularly performed the yard operations of a 1,400 hp. steam design. With Diesel power costing $87.50 per hp. and steam locomotives, $35.00 per hp., capital investment for the two alternatives would be:

Diesel: Five 600-hp. units at $87.50 = 5 × 600 × 87.50 = $262,500.

Steam: Seven 1,400-hp. units at $35.00 per = 7 × 1,400 × 35 = $343,000.

This condition does not hold for road power, however, due to the higher operating speeds and the Diesel investment is invariably greater than that required for steam. Neither does it hold in yard service if motive power inventory is insufficient to support the five to seven advantage displayed by the Diesel. Table II illustrates this point.

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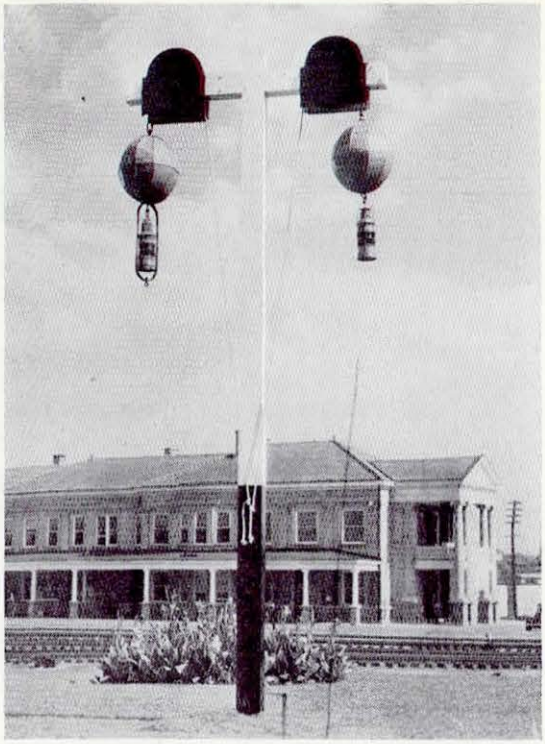

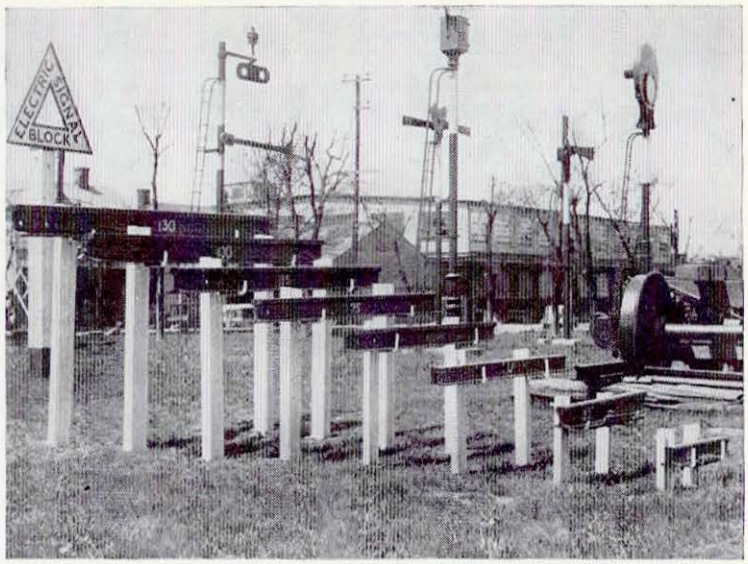

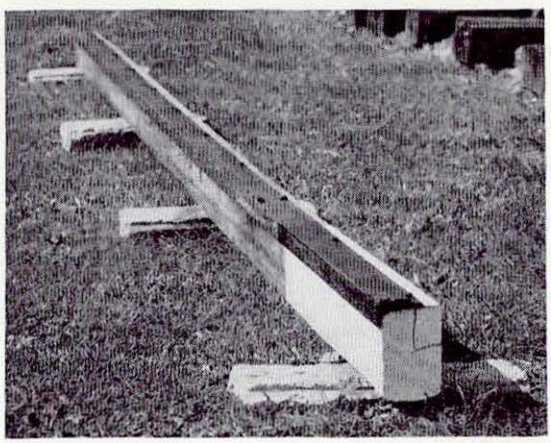

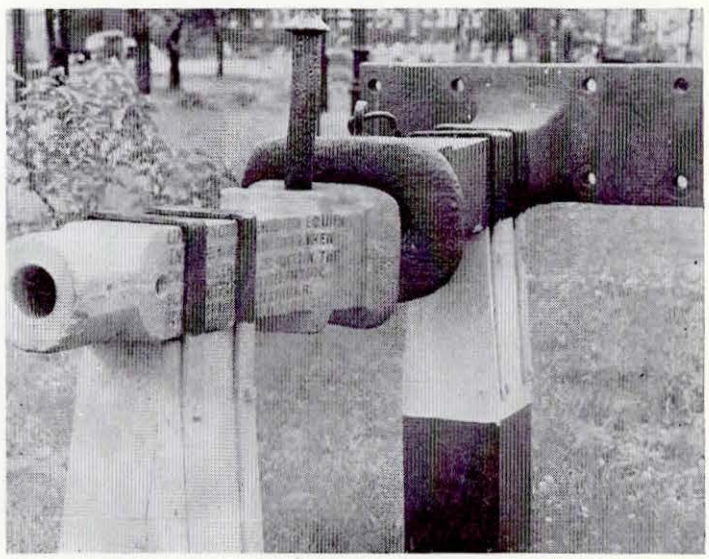

The Southern's Museum Has Gone into Scrap

At Lexington, Ky., the Southern for 16 years past had been assembling a collection of old-time signals, rails and other devices which served railroading of an earlier day. Now the museum pieces have gone into scrap to aid the war production program.

From Top to Bottom, Above: A "Highball" Signal, a Segment of Strap Rail; Right, 60 Years of Rail and Signal Development, a Basket Torch (Floodlight, 1880 Style), Link & Pin Coupler.

Airlines—How Dangerous a Rival?*

They will put up stiff competition for passengers and mail, but are seen promoting, rather than diverting, freight traffic

By W. A. Patterson

President, United Air Lines

I HAVE great confidence in the postwar future of aviation. I firmly believe in the peacetime to come that the airplane will occupy an important place in the international scheme of transport and communications. On the other hand, I feel sure that this picture is being distorted, perhaps in a harmful way, by overenthusiastic predictions of the influence of the airplane in the postwar world.

Exaggerated Claims for Air Transport

Such statements as the following are typical of what I believe to be the overenthusiastic viewpoint of aviation's future prevailing in many quarters today:

"Inexpensive transportation is *inherent* in the airplane itself."

"The airplane is destined to be the *least expensive* form of transportation known to man."

"The airplane will be completely accepted as the *only* suitable means of intercontinental travel."

"The United States should immediately undertake to provide an air fleet designed to carry *the bulk* of the nation's and the world's cargoes."

We all have great confidence in the future of our business and we have all made enthusiastic statements in regard to its future development. I, for one, have stated on many occasions that the airplane is going to revolutionize our social and economic habits as we have known them to be in the past, and as a result this will have the effect of changing our methods of merchandising and distribution. I still believe this firmly. However, overenthusiasm can lead to failure in expectations. When statements are made that our older forms of transportation—the railroads and steamship lines—are doomed, such statements cannot be supported by facts.

Air transportation will augment surface transportation, not supplant it. Surface transportation will progress as a result of air transport's development, rather than be retarded by it. As a result of the war, we are now seeing a widespread use of air transportation because of the strategic value of "getting there first with the most men and materials," as well as because of a shortage of surface shipping, and in certain areas the entire absence of any means of transportation whatsoever.

When we evaluate the use of the airplane in our present war activity we must realize that cost is an unimportant factor in our wartime transport formula. In peacetime commerce, we do know that the dollar cost of transportation becomes all important in determining the transport method which will be used.

The vital part air transportation is playing in this war will not be fully known until some day in the future, because of the confidential nature of many of its present activities. We can say, however, that the flexibility of the airplane is proving of immeasurable value. The territory served by air transportation companies of this country is far greater than the average person realizes. We have not been limited by the boundaries of land or water. I am sure that when the job we have done can be told, you will be proud of our accomplishments. All transportation is today accomplishing outstanding results in about the same manner.

The railroads and steamship companies, who are aroused by the many enthusiastic statements regarding the future of air transportation, are studying the postwar problem to see if they too should take to the air. This is a question that will be decided on the facts developed by study and will, of course, be influenced to a great extent by government policy. We do know that all studies made prior to the war do not disclose practices or facilities existing in common on both the airlines and railroads that would bring about any economy as a result of consolidation. The one and only common objective is the desire for business. We will definitely be competitive for certain types of passenger business and certain types of express. The gains the railroads will achieve in freight traffic which will be created by the airplane will more than offset their loss of passenger business to the airlines.

Let us examine the relative cost of freight transportation by surface means and by air. These comparative costs which I will give you are the result of much research and study by our statistical and economic research department to find some of the answers ourselves. They are, of course, based on the operating costs of present airline equipment, such as is now in commercial operation in this country.

Train and Plane Costs Compared

First let us compare the freight train with the cargo airplane on the basis of normal peacetime conditions.

The average freight train would consist of 50 cars, 30 of them loaded with 26 tons of freight each, and 20 of them empty. Such a freight train, based on actual railroad statistics for the year 1940, would carry a total of 780 tons. Operated between Chicago and San Francisco, it would give sixth morning delivery and could make two round-trips in a month's time.

Therefore, every month it would deliver a total of 1,560 tons each way between those two points. An oil-burning locomotive pulling this train would consume 170,000 gal. of fuel oil during the month, which at 2 cents a gal. would cost $3,400. The operating crew on such a freight train would number five men, and an equivalent of four crews or 20 men would be required to keep the train running. Their total pay would be approximately $5,000 for the month. The total operating cost of the train, based on 1940 railroad experience, would amount to $50,000 for the month, which repre-

* Abstract of an address to the National Industrial Conference Board, New York, November 24.

sents the cost of moving 1,560 tons by rail from Chicago to San Francisco, and another 1,560 tons from San Francisco to Chicago during the interval of one month, or two round-trips.

Now, let us do the same job by airplane, using the familiar "Mainliner" type of equipment which is now in use on our line, but converting it to small cargo-type airplanes. The average lifting capacity of such an airplane would permit it to nibble in small bites of only 2¼ tons each at the 1,560-ton pile of cargo moved by the freight train in one month's time. It would take 626 bites, or 626 airplane round-trips between Chicago and San Francisco to do the same job that the freight train did in two round-trips. This represents 2,500,000 miles of flying compared to 8,880 freight train-miles.

A single airplane could not make that many round-trips between Chicago and San Francisco in a month's time. Normal operating experience would indicate 11 round-trips per month per airplane as the average. On this basis 57 airplanes would be required to do the job of the freight train. During the month these airplanes would consume 1,500,000 gal. of gasoline, compared to the 170,000 gal. of fuel used by the train. The gasoline would cost a total of $200,000 compared to a cost of $3,400 for the fuel used by the train. 400 pilots would be needed to fly the airplanes as against 20 crew members to keep the train running. The pilots would receive a total of $200,000 in pay for the month while the payroll for the train crew members would amount to $5,000.

Based on recorded experience, the total operating costs of the airplanes would amount to $1,750,000 during the month while the freight train costs would total $50,000. The airplane operation would therefore cost 35 times as much as the freight train.

What has the airplane contributed to the economic picture in return for this large additional expenditure? Speed? In both examples the same number of tons have been moved the same distance in the same length of time—the ton-miles-per-hour are the same. Of course, two freight trains could move the entire 1,560 tons from Chicago to San Francisco in six days time and our airplanes could do it in about half a day, if 626 of them were assigned to the job—but that is another story. Prior to December 7, there were only 362 commercial transport airplanes in use on all the airlines in the United States.

For the large bulk of commodities, speed in transit is a relatively unimportant consideration. The most important factor is the rate of flow—the laying down at destination of a given number of tons per month.

In the example I have just given, one "Mainliner" type cargo airplane was approximately equivalent to one freight car in the amount of work accomplished per month. If the airplane is to be visualized as taking over the entire job of all the freight cars in the country this is perhaps an unfair comparison. Due to the long-haul nature of our example, we made the freight car work overtime, 300 miles a day, as against an actual country-wide annual average of only 36 miles a day. If the airplane were to take over the entire job being done by the nation's freight trains, its efficiency might be expected to drop too, because of the short-haul characteristics of the preponderance of traffic, the unbalance between directional movement, seasonal fluctuations, and the tremendous terminal problem that would result.

20 Million Jobs if Planes Ousted Trains

A fair comparison might be to expect one of our present-day airplanes to do the work of three freight cars. It is reported that we have in this country 1,800,000 freight cars and on this basis 600,000 transport airplanes of the present commercial type would be required to replace them. During a year's time these planes would consume 122 billion gal. of gasoline, which is two and one-half times more gasoline than the pre-war cracking equipment capacity of all the refineries in the world. 2,500,000 pilots would be needed to fly this fleet, and the total airline personnel would run 20,000,000, or 15 per cent of our entire population.

Let us now turn to a comparison of today's ocean-going freighter and the cargo airplane. For our freighter we will use a vessel of 13,000 tons loaded displacement, similar to the type currently being constructed in great numbers by our shipyards for the Maritime Commission, and we will sail it between San Francisco and Brisbane, Australia. The revenue load of such a ship would be 6,400 short tons, and in peacetime operation it might be expected to make the round trip of 14,000 statute miles in two months' time. The fuel oil consumed for the

Air Transport Analyst

Mr. Patterson was born in Hawaii in 1899 and attended grammar school and high school at San Francisco. In 1914, when he was 15 years old, he entered the employ of the Wells Fargo Bank & Trust Company, San Francisco, and remained with that institution until 1928 when he entered the aviation industry.

From 1929 to 1931 Mr. Patterson was assistant to president, Boeing Airplane Company and Boeing Air Transport, at Seattle. From 1931 to 1934, he was president of Boeing Air Transport, Pacific Air Transport, National Air Transport and Varney Air Lines. From 1932 to 1934 he was vice-president, United Air Lines, and since the latter date has been president of that corporation.

round trip voyage would be 425,000 gal., which would cost about $9,000. There would be 55 in the crew and their pay for the two months' period would total $15,000. Based on the experience of a coastwise shipping company, probably high for trans-Pacific operation, the total operating costs chargeable against the two-month round-trip would be $120,000.

The airplane we are going to use to perform this same job of moving 6,400 tons of freight from San Francisco to Brisbane and another 6,400 tons on the return trip, all in two months' time, would be of the four-engined type which but for the war might be in use on our airlines today, and which is currently being used by the Army in some of its transport operations.

Such an airplane would carry four tons of revenue load over the distances required between fuel stops, and therefore 1,440 trans-Pacific round-trip flights would be required over a period of two months to transport the load carried by the surface freighter in one round-trip. This requires an airplane departure every hour, and represents 21,000,000 miles of airplane flying compared to 14,000 miles of surface ship travel.

250 Times as Costly as Steamships

An airplane can make the round-trip in six days and therefore could fly ten round-trips in the two months. 144 airplanes would be required. These airplanes would consume about 18,000,000 gal. of gasoline while the boat was burning less than a half million gal. of fuel oil. The cost of this gasoline would be $2,250,000 compared to $9,000 for the ship's fuel. Thirty-five hundred airplane crew personnel would be needed as against 55 to man the boat. The airplane crews would receive a total of $3,000,000 in pay for the two months compared to $15,000 in wages paid to the ship's crew. Total airplane operating costs, based on present figures, would reach an aggregate of $29,000,000—250 times the surface freighter's round trip cost of $120,000. Again, both have performed the same job in ton-miles-per hour.

Refueling is still another problem that the airplane would have to meet in competing directly for the more substantial tonnage capable of being carried by the ocean vessel. Nearly 15,000,000 gal. of gasoline would have to be transported to intermediate points and to Australia every two months by ocean-going tankers. Three such tankers would be required for this purpose, so that actually *144 airplanes plus three tankers would be required to do the job that could be accomplished by one ocean-going freighter in the first place.*

Of our total exports to Australia the most important single group in terms of value is machinery. Typical of this group would be ⅓ hp. electric motors, which have an export value of about 30 cents per lb. From the comparative cost figures just developed it can be computed that the rail transportation cost of these motors from Chicago to San Francisco would be $^{8}/_{10}$ cent per lb., and the shipping cost by surface vessel from San Francisco to Brisbane, Australia, ½ cent per lb. The total cost of transportation from Chicago to Australia, amounting to 1⅓ cents a pound, is equivalent to four per cent of the value of the motor. That is the transportation cost by surface means. If shipped by air, the cost from Chicago to San Francisco would be 31 cents per lb. (slightly in excess of the value of the motor), and from San Francisco to Brisbane $1.28 per lb. The total is $1.59—over five times the per lb. value of the motor.

This high transportation cost might be well justified if some plant in Australia were shut down due to motor failure and no replacements were available locally. By use of the airplane the plant could be operating again in four days, whereas if the replacement motor were shipped by surface means, four weeks would elapse before the situation could be remedied. Under such circumstances such a high tariff would no doubt be justified, but for the large quantities of motors needed to meet normal demand, the high cost of transportation by air would be hard to justify.

On the return trip a typical commodity imported from Australia is raw wool, also having a value of about 30 cents per lb. of shipping weight and therefore would give us the same effect on the cost of such wool laid down in San Francisco. Among our 1940 imports from Australia there is listed 558 oz. of platinum valued at $26,000, equivalent to a value of $560 per lb. Here the cost of air transportation would amount to $^{3}/_{10}$ per cent of the value of the commodity—a ratio making such shipments entirely practical. Unfortunately, there were only 558 oz. to be shipped.

Admittedly, the examples I have given you are based on present-day costs which are without question high because our business is relatively new and we haven't yet had the opportunity to take advantage of all possible economies. Furthermore, I would not want to leave the impression that we haven't confidence in our ability to take advantage of technological advances in the design of equipment and increases in the efficiency in the use of equipment that will bring about major economies. But these examples afford an idea of the magnitude of the problems that must be solved and the time required to solve them if the cost of air transportation is ever to be brought down to a level where it can compete with surface transport on a strictly dollars-and-cents basis.

There is still much uncertainty as to the cost of operating the giant airliners projected for the future. Most studies treat direct flying costs in considerable detailed accuracy and then slap on overhead on the basis of a fixed percentage. This is the procedure usually followed by those who have not had the opportunity of actually being engaged in airline operation. They have given very little attention to the evaluation of terminal costs, and pickup and delivery of merchandise either side of the terminals. Surface carriers have found that their terminal costs are at least equal to and often greater than their over-the-line costs.

What Load Factor?

Little thought has been given to the fluctuation of traffic within the day, from season to season, or to the unbalance in directional traffic flow, or to the short-haul nature of the greater part of all traffic. All these things tend to set limits on utilization and load factors which no one other than those engaged in the business can determine.

Our engineering research department has tabulated the possible reductions in direct flying costs that might result from a full realization of all the technical advances that are now in the development stage. Included are such possibilities as:

1. Design of the aircraft to suit the job which it must perform.
2. Higher lift and lower drag characteristics.
3. Advances in structural design and materials, allowing major increases in useful load capacity.
4. Power plant improvements, such as lowered fuel consumption, partial set propulsion.

5. Improvements in terminal and aircraft loading and unloading facilities.
6. Improved airports—layout and size.

All of these things taken together might reduce direct flying costs as much as 60 per cent, but, taking overhead costs into consideration, total costs would probably be lessened only by about 35 per cent. This would be at current traffic volumes. The effects of increased volume in reducing costs is well known in all lines of business. In the air transport industry based on the record of its performance to date, and assuming that the law of diminishing returns will not begin to exert its tempering influence, we might logically assume that a hundredfold increase in all traffic volume from today's levels would result in a further reduction of 60 per cent in total unit costs. Therefore, the combined effect of all the presently-contemplated engineering advances, plus a hundredfold increase in volume, might be expected to reduce overall ton-mile costs from their present average of around 40 cents to levels somewhere in the neighborhood of 10 cents per ton-mile—still many times the cost of surface transportation which measures its ton-mile costs in mills.

Railroads Too Can Reduce Costs

We must also bear in mind that while the air transport business is reducing its costs the railroads and the steamship companies will be doing the same. I have the greatest respect for the management of our railroad systems in this country and I am sure that they will also be making progress, particularly as a result of the benefits in the experience of doing the grand war job they are accomplishing. Improvements in their rolling stock and trackage, held in abeyance because of the war, will some day provide additional tools in their competitive sales kits.

With the potential for greatly lowered costs existing in all fields of transportation, it appears to me logical to assume that there will be a tendency to maintain present cost differentials, or at least to put a brake on a possible converging trend.

As I see it, air transportation is going to revolutionize practically every social and economic viewpoint and practice. In the field of passenger travel, the airplane may well take over a major share of the volume. Passengers as a commodity have a high value per lb. and per hour and require a relatively large amount of cubic space. These factors combine to make the costs of transporting passengers by surface means and by air somewhat more comparable than is the case with other cargoes. Individuals are also influenced by consideration of convenience, comfort and such other intangibles as the romance and prestige associated with travel by air.

But an inanimate piece of cargo presents a different problem. Here values per lb. bear a much lower relationship to transportation costs. The time saved must be business time, and it must be strictly worth the saving, and weight can be concentrated in a much smaller space. We have already suggested some of the conditions that must exist in order to justify shipment of freight by air:

1. An emergency has to be met,
2. An opportunity must exist for a substantial saving in warehousing and inventory costs.
3. Commodities must have a value per lb. sufficiently high to make possible worthwhile savings in financial and insurance costs.
4. Surface transport must be inadequate or nonexistent.

In the future field of transportation the airplane can make an increasingly important contribution over the years, as its operating costs are gradually reduced through technological advances and increased volume. But there is another, and perhaps most important contribution, that the airplane has to make to civilization. We see indications of it by carefully analyzing what is going on in the field of transportation in the world today. For example, take the following items clipped from a publication of the United States Department of Commerce:

"Portents and promises to world trade are seen in the air-freight service being developed between the United States and the nations helping it to fight this war. For some time it has been known that Army and Navy ferry planes have been speeding war goods to far-distributed outposts; they are also bringing back equally vital raw materials without loss.

"Block mica has been flown in from India. Planes returned with $475,000 worth of platinum from the Persian Gulf and with beryl ore, quartz crystals, industrial diamonds, and mica from South Africa. Crude rubber has been air-freighted from Brazil, balsa wood from Central America; 20 tons of rubber seeds were ferried from Liberia to the Western Hemisphere.

"Tonnages involved are sometimes tremendous—at least for air freight. In eight weeks, 32 tons of bristles for the Navy, 70 tons of silk for parachutes, 47 tons of tin, and 70 tons of tungsten were moved from China to India. Later, 98 tons of tungsten were flown out in 10 days.

"One of the most striking use for planes was the dispatch of beetles from the Fiji Islands to Honduras to check a root weevil attacking hemp growing on an experimental plantation."

In each of these examples the commodity was flown by air because an emergency existed or because surface transportation was temporarily inadequate or did not exist. All over the world steps are being taken to remedy deficiencies in surface transportation as rapidly as possible. The airplane has opened up Alaska to our armed forces, but the Alaskan Highway, just completed, will henceforth carry the great bulk of supplies necessary to maintain them there.

In Africa, where in many areas the camel is the only means of surface transportation, the airplane has again pioneered and has made it possible for our armed forces to establish themselves effectively in that area. But again, roads and rail lines are being laid down as quickly as possible so that the larger traffic volumes required by an expanding activity can be effectively handled.

Political emissaries, business organizers, salesmen and their samples—all of these will find their spheres of influence made enormously more effective through the use of airplane travel. All first-class mail, and a large share of express package traffic will find the airplane a most efficient medium to use in their mission of promoting the general well-being of the world.

Future Lies in Developing New Traffic

The future of the airplane in commerce is indeed great—but it appears that this future can be realized without serious inroads upon the steamship lines or the railroads. The volume of domestic air cargo could increase one-hundredfold and yet capture only one-tenth of one per cent of the freight ton-miles now carried by the American railroads. But, apart from that, the airplane should be expected to stimulate the generation of the type of traffic that is the rightful field for surface carriers.

The business of air transportation can be considered as a sales department for the whole transportation industry, promoting traffic that will rebound to the benefit of all forms of carriers, with each type fulfilling those requirements in our future economy peculiar to its own inherent characteristics.

A New Path to Maximum Production

Amazing record of the railroads has come from the evolution of a managerial method which avoids both rigid centralization and individualistic anarchy—Collaboration attained to high degree, springs largely from self-disciplined voluntary action

[*Following are excerpts from the address of E. E. Norris, president, Southern Railway, to the National Association of Manufacturers, New York, December 2.*]

Eighty-five percent of the *increase* in the nation's total freight traffic since Pearl Harbor has been handled by the railroads. The remaining 15 percent of this increase has been divided between the highway, waterway, airway, and pipe-line carriers. Likewise, this year, the railroads will handle more passengers than they have ever handled before; more than twice as many passengers as they handled in 1939. This year, the railroads will handle more freight than they have ever handled in any one year in all their history; almost a third more than they handled last year; well over twice as much as they handled in the last year of peace, 1938.

The most important thing I can tell you about railroads is not that "we've passed the ammunition" but rather *why* we have beeen able to do our part of the war job so successfully. In this "why" we may find some useful guideposts to help us in our journey toward victory and a better world.

Inherent flexibility of railroad operation is one of the chief reasons why the railroads have been able to do their war job so well—that and because they have always been equipped and maintained to handle peak loads. Perhaps the simplest illustration of the flexibility of railroading is the fact that one locomotive can pull 50 or a hundred freight cars about as easily, and certainly as economically and efficiently, as it pulls 10; a coach can carry 60 people as well as it can carry half that many.

In normal times, carloadings during the usual fall peak of six weeks are about 20 percent greater than they are during all the remaining weeks of the year. The variation in the volume of passenger traffic is even sharper and greater, with many relatively short peak loads coming in the vacation months, or week-ends, and around the holiday periods. Yet the railroads must always be equipped and maintained to move the maximum volume of freight and passenger business—not the minimum or even the average volume.

Fortunately, war traffic is not seasonal and, thus, when the war load came along, the railroads were able to meet the first shock of war-stimulated traffic by dipping into their inherent reserve capacity.

"Preparing today for the traffic of tomorrow" is a second reason for the railroads' success in meeting the present crisis. Twenty years ago the railroads, in collaboration, adopted that policy. During the intervening years—and in keeping with this policy—the railroads spent more than 10½ *billion* dollars for new equipment and facilities. As a result of these huge expenditures they were ready with a modern, efficient plant when Uncle Sam began calling for more and more transportation service.

Tapping every known source of extra capacity is a third expedient to which the railroads have turned. Between the date that war broke out in Europe and October of this year, they *increased* the number of freight cars available for service—by *reducing* the number of cars awaiting repairs. Percentage-wise, the drop was from almost 14 percent to less than 3 percent. That meant 190,000 more serviceable cars with which to do the job.

In the same period, they *increased* the supply of serviceable locomotives by *reducing* the number awaiting repairs from almost 20 percent to less than 6 percent. That meant about 5,700 more locomotives at work.

They bought all the new equipment that could be bought. With the help of almost every shipper in the land, they loaded more tons of freight in every car. They increased the average train load by more than 25 percent. They got 40 percent more service out of every car and 32 percent more work out of every locomotive. In short, under the pressure of war needs, they have shattered every efficiency and utilization record on the books.

Co-operation by the armed forces, the war agencies and every other patriotic shipper in the country—is a fourth reason why the railroads have been able to make the record they have made. This effective co-operation, which has been translated into increased capacity, was not created overnight. It is the product of machinery of collaboration which foresight established years ago—and which has given the railroads and their customers a means for working together harmoniously and intelligently. This co-operation has helped immeasurably to bring about a more efficient use of railroad plant.

Joseph B. Eastman is a fifth reason why the railroads have been able to add a bright chapter to the story of a democracy at war. His wise counsel, understanding, sympathy, and friendly guidance, and that of his associates in the government's Office of Defense Transportation, have been an important contributing factor in the railroads' achievement. I can choose no more fitting words to describe this fortunate and happy relationship than those used recently by Chairman Clarence F. Lea of the House Committee on Interstate and Foreign Commerce:

"From the beginning," he said, "Director Eastman's whole attitude has indicated that he is one of the few men in public life, regulating a private industry, who is making every effort to keep up the morale of that industry . . . and to inspire the friendly confidence of the agencies he regulates."

To which I must add, not only a word of assurance that the railroad industry's morale was never higher and that Joe Eastman has the sincere respect and confidence of every railroad officer I know, but the equally pertinent observation that the resulting teamwork between the O. D. T. and the railroads has been a major factor in the latter's contribution to the war effort.

More than a million loyal railroaders is a sixth reason why the railroads have made the record they have. The railroads today can take great pride in their war record because it reflects the determination, the courage, the vision, the stamina and the resourcefulness of these men; because it expresses, in significant terms, the tradition of railroading itself—the job must be done, the trains must go through.

There you have the "why" of an achievement that has already made a shining page in the history of this nation's fight for survival. And incidentally, there you have an answer to the beady-eyed crack-pots who are always sniping at private enterprise and questioning the capacity of free Americans to work together, to sacrifice, to do great deeds in the American way.

The railroads will continue to handle the war load. We have no doubts about that. How much more we can handle; how much commercial traffic can pile on top of the war load, depends upon a number of factors. However great our desire; however strong our resolution to do our best regardless of what the odds may be against us, we cannot escape from the immutable laws of space and time; we should not ignore the physical limitations of our transportation plant.

The best estimates of next year's freight traffic promise an increase of at least eleven percent over this year's record level, and we know that passenger traffic will continue to climb to unprecedented heights.

To handle next year's record-breaking volume of business, the railroads conservatively figured what they would need in the way of new locomotives and freight cars, new rail, and steel for the maintenance of both track and equipment. They confined their estimates entirely to freight equipment and roadway needs, knowing full well that all new passenger equipment was "out" for the duration.

Just a few days ago, the WPB—unquestionably doing its best to allocate wisely the nation's limited supply of steel—announced that the railroads would be permitted to buy considerably less than they had asked for. I am sure that we do not need a crystal-gazer to forecast the effect of this ruling, if it is to be applied to our requests for all of next year. The net is this:

Unless we can get all the cars and locomotives and rail and maintenance materials we need, or unless we can continue to perform miracles indefinitely, we may encounter difficulties in moving *all* of next year's traffic efficiently and promptly.

Less new equipment and repair parts than we know are going to be needed—such is the decision. We are not asking for strategic materials to go into fancy passenger trains. We are not asking for equipment to haul luxuries around the country.

We are not asking for the wherewithal to carry on "business as usual." We are asking for the things we need to keep America's war machine running in high gear; the things we need to keep America's millions supplied with the essentials they have to have, to live and to work.

We have deferred for the duration all of our promotional efforts; our advertising for freight and passenger business; our solicitation activities; our competitive maneuvers; our old fight with competing agencies of transport. Instead, we are concentrating every bit of our energy and strength and resourcefulness on the job of providing satisfactory transportation for the essentials of war and of life, so that the great sacrifices of American industry in converting from peacetime to wartime production will not be in vain.

Nor do we have any thought of building up our properties beyond the minimum standards necessary to do our present job safely and effectively. We want only enough equipment and materials to keep on railroading at the dizzy pace demanded by the times.

Getting Materials for Railroads*

Importance of railroads to war effort conceded but carriers are told to limit their budgets and repair work to essentials

By Andrew L. Stevenson

Director, Transportation Equipment Branch, War Production Board

THERE is no need to reiterate the importance of the national railroad system in the successful prosecution of the war or the importance of the railroads receiving the amount of essential materials necessary for the essential maintenance of the essential plant, both way and equipment. There may be some difference of opinion, however, as to what is essential both in maintenance and in the size of the plant to be maintained, as well as what materials themselves are indispensable.

In the substitution of less critical materials, the railroads already have done a splendid job. Motive power has been redesigned to utilize carbon steel entirely and to relieve the pressure on alloys with their use of such metals as nickel, chrome, manganese and tin. Rolling stock, too, has been redesigned to save steel by the employment of more wood. Innumerable centralized traffic control projects have been reworked to save copper. The need for further study and for taking action to utilize less critical materials becomes daily more imperative, however, and we are gradually enlarging our staff of technical experts to work on these matters with the railroads, the associations and the manufacturers. Among other fields, that of specialty and accessory items seems a most appropriate place for continued effort.

In utilizing materials only for essential maintenance, much has been done, but much more remains to be done. It has been standard practice for the railroads to increase their maintenance budgets in years when earnings were good. The augmented use of materials for maintenance that results primarily from the latter policy, however, is

* From an address before the American Short Line Railroad Association Convention, Atlanta, Ga.

not one which can be happily condoned in these times. Efforts are now being put forth, which I hope will be successful, to provide a means whereby the railroads may accrue certain maintenance charges without actually incurring them and impound current earnings for future expenditure for this purpose. It may well be that the railroads will be among the foremost contributors to the financing of the war through their purchase of war bonds.

While maintenance and heavier expenditures for maintenance with present traffic is proper, there are many places where railroads have and can contribute to easing the material situation by expenditures for maintenance based primarily on preserving the property intact for the duration of the war, rather than repair the property on a basis looking to recovery of money expended through long term amortization of the labor and material costs. Most roads have appreciated this fact in their bridge work by replacing in kind individual bents rather than to engage in a full bridge replacement on the assumption that the bridge will be adequate for the duration.

So too in track work, the roads are taking a shorter joint bar with the expectation of returning to a 36-in. bar when the war is over. Again, on the same grounds, we have requested that serviceable K brakes be repaired rather than replaced at this time with the AB brakes. Likewise, major rebuilding and heavy repair programs are suspended for less material-consuming patch work where this will suffice for several years more service life.

Inasmuch as car repairing is now the major consumer of railroad plate, this procedure is one of extreme importance. Similarly, the maintenance of the present ownership of petroleum tank cars is being attained by building replacement cars with a tank of thinner gage, which, though of short life, will answer immediate requirements. Although other examples and possibilities can be mentioned, suffice it that we all are aware that adequate maintenance of our physical plant can be achieved within certain limits without the same degree of material expenditure that would be fitting in other circumstances.

Circuitous Routes to Be Discouraged

Maintenance of essential physical plant required to perform essential service, furthermore, does not necessarily mean the retention of all the physical plant. An illustration of this is the policy of taking up some branch lines and short lines, which do not perform any particular war transportation service, in order that the rail may be available for presently more significant use. In general, the saving in critical materials through the contraction of unessential plant, I am aware, is a topic much less tangible of evaluation. Rather than conservation of maintenance materials through elimination of plant not employed in required service, the problem probably is one chiefly of diversion of this plant from such service to more imperative needs. A case in point is that of the conversion of parlor and lounge cars to passenger coaches of greater carrying capacity. A further consideration of this character might well be questioning the maintaining of motive power for certain types of passenger service which could be utilized in freight operations.

On the other hand, a careful weighing of the most profitable employment of railroad materials might also lead to change in routing of freight traffic. I think there is grave doubt whether at this time materials should be allocated to secondary lines of the larger railroads or to some short lines which do not originate or terminate traffic and whose principal function is a circuitous diversion of bridge traffic at the expense of materials not only for track and operations, but also for motive power to perform the necessary yard work at both ends of the short route. It is certain that there is no doubt that solicitation of additional traffic of this character, requiring increased track facilities and possibly equipment, where the movement can be handled much more economically material-wise by the road from which it was diverted, cannot be countenanced under present conditions.

I have expressed the opinion that, generally speaking, there appears to be no reason to believe that the materials outlook will impair essential maintenance of existing plant. This has been our policy with respect to both track and rolling stock. The first chiefly involves only materials; the second involves both repair and replacement. After the initial expansion of freight car ownership contained in the first quarter of the 1942 program, the ensuing car program contemplated only the maintenance of that ownership figure. In the case of motive power, however, the policy has been one not only of maintenance of existing tractive effort, but of increasing it.

A Bad Winter Might "Reveal Some Inadequacy"

It was obvious that the greater utilization of freight car carrying capacity through heavier loading and quicker turnaround, resulting from the magnificent work of both the railroads and the shipping public, would throw out of balance the ratio between aggregate usable tractive effort and freight car capacities if locomotive construction were not continued. It does not yet appear that such balance has been achieved, and an extremely bad winter might well reveal some inadequacy.

Whether this balance will be gained through the completion of locomotives now scheduled through the first quarter of 1943 would seem doubtful, for the railroads and shippers are capable of even better records in their utilization of cars. Whether a weighing of requirements for additional equipment, when they are presented, and of the other requirements for materials for the making of munitions and ordnance will result, however, in more than a retention of car ownership or aggregate tractive effort at their present figures, I do not now know.

But this I do know—that just as this war cannot be won without an adequate railroad system, it cannot be won without an Army, a Navy and an Air Corps adequately equipped with guns and shells and tanks and warships and aircraft, and without ships to carry this equipment and men to use it where it should be used. All these things take material just as a good railroad takes material. All of us in the field of transportation have the most serious obligation to see that every ton of material received by us is employed most efficiently and effectively in rendering essential service.

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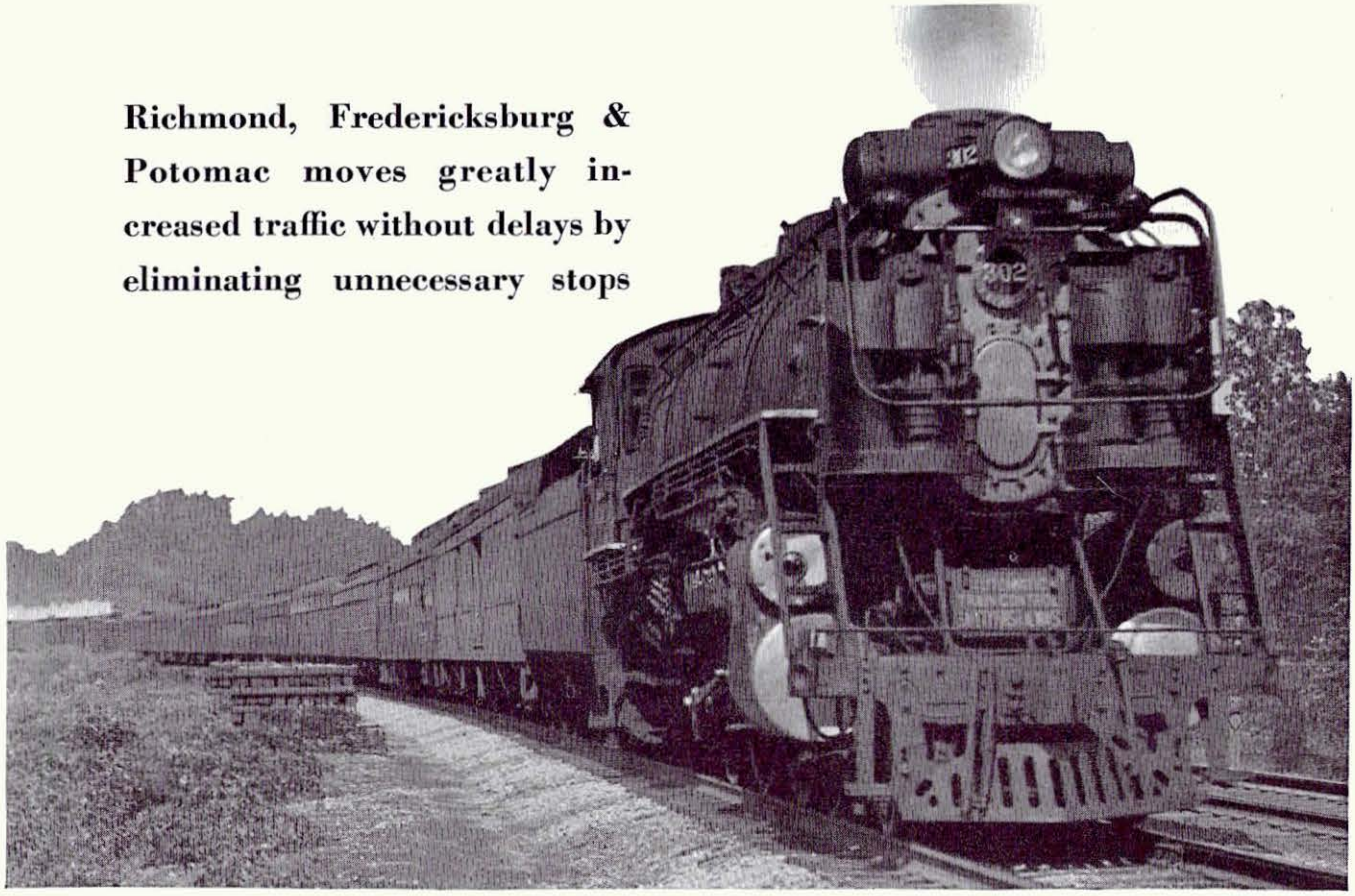
MINNESOTA'S RACE with time to get its year's quota of 42,000,000 tons of iron ore to the Duluth-Superior docks before the November freeze closes the lakes was aided by the delivery at Ambridge, Wis., on October 14, of the last of 500 hopper-ore cars built by the Pullman-Standard Car Manufacturing Company at its Michigan City, Ind., plant. The cars are part of a 1,500-car order, divided equally among three companies by the Duluth, Missabe & Iron Range, with Pullman-Standard being the first to complete its share. The hopper cars, half as long as an ordinary freight car, carry 70 tons of ore. The railroad placed orders for 2,000 cars early in March but before work could be started the WPB froze freight car construction and on May 11 released orders for 1,500 of the hoppers.

Twice as Many Trains to Handle

Richmond, Fredericksburg & Potomac moves greatly increased traffic without delays by eliminating unnecessary stops



The R. F. & P. Is Handling More Than Twice As Many Passengers As Last Year

IN the first six months of 1940, the R. F. & P. handled 4,034 freight trains; in the comparable period of this year, it operated 8,069 freight trains, or almost exactly twice as many. In June, this road operated 1,590 freight and miscellaneous trains and 1,198 passenger trains, a total of 2,788 trains and an average 92 trains per day. In the first six months of 1940 a total of 10.582 trains, or 58 per day, were run; in the same period of 1941, this figure was increased to 11,703 trains, or 65 per day, and, in 1942, to 15,548 trains, or 86 per day. By October the daily average number of trains had increased to 45 freight and 55 passenger trains, or 100 trains per day.

Largely Increased Traffic

Even these figures, however, do not accurately reflect the huge traffic increase on the R. F. & P., since both freight and passenger trains are longer and more heavily loaded. In the first six months of 1942, the R. F. & P. handled 2,052,837 passengers, which is nearly twice as many as were handled during the *entire year* of 1940 and more than four-fifths as many as were handled in the year of 1941. The months of July, August and September showed further large increases. During these three months in 1942, the R. F. & P. handled 1,474,688 passengers—142 per cent over the same period of 1941, and 505 per cent over the "normal" year of 1939. Table No. 1 shows graphically how this traffic has grown by leaps and bounds on the R. F. & P.

Table 1. Passengers Handled

	1940	% Increase Over 1939	1941	% Increase Over 1940	1942	% Increase Over 1941
Jan.	158,891	38	190,213	20	299,564	58
Feb.	146,122	27	187,021	28	284,810	52
Mar.	165,942	38	233,738	41	342,288	46
Apr.	114,185	12	217,919	91	355,877	63
May	83,536	23	164,589	97	374,811	127
June	87,085	16	185,137	113	395,487	114
6 Mos. Total	755,761	27	1,078,617	43	2,052,837	93

In the first six months of 1942, the R. F. & P. handled 5,780,812 tons of freight. This was more than was handled during the *entire year* of 1940, and increases of more than 100 per cent in freight tonnage over 1940, have been recorded in every month since February of this year. In April, for example, the 1942 tonnage was 175 per cent more than in 1940, and 111 per cent more than in 1941. Table No. 2 depicts the increase freight traffic in detail.

At all times and more particularly in time of war, the R. F. & P. supplies a highly important link in the transportation system between the North and the South. This 116-mile line, extending between Richmond and Washington is, in a sense, a double-track "bridge" between the Atlantic Coast line and the Seaboard on

This Type of Locomotive Averages 225 Miles Per Day on the Busy R. F. & P.

the South and the Pennsylvania and the Baltimore & Ohio on the North. All the New York-Florida streamliners, and, in fact, all through New York-Florida passenger trains operate over the R. F. & P. In normal times, the largest single classification of freight consists of citrus and other fruits and vegetables. This traffic, as well as much other formerly water-borne traffic, has been increased materially by the removal of coastwise steamships. Also, by reason of the favorable climatic conditions, a large number of military establishments are located on the A. C. L. and the Seaboard. On the R. F. & P. itself, the U. S. Marine base at Quantico, Va., 35 miles south of Washington, has been materially enlarged, and there are several other military establishments in this area. All of these have had the effect of increasing the traffic so materially on this railway.

Table 2. Freight Traffic (In Tons)

	1940	1941	% Increase Over 1940	1942	% Increase Over 1941	% Increase Over 1940
Jan.	390,496	488,860	25	747,300	53	90
Feb.	380,236	467,775	23	763,112	63	100
Mar.	405,807	576,514	42	975,950	69	140
Apr.	386,314	493,245	28	1,039,389	111	175
May	435,128	613,166	41	1,126,415	84	158
June	422,671	618,936	46	1,128,846	82	167
6 Mos. Total	2,420,652	3,258,496	34	5,781,012	77	138

Potomac Yards

The R. F. & P. owns and operates the huge Potomac yards at Alexandria, Va., just across the river from Washington. This is reached by an electrified line of the Pennsylvania from the North over which the B. & O. interchange is also handled. From the South, it is reached by the Southern as well as the R. F. & P., and the Chesapeake & Ohio reaches the yard through trackage rights over the Southern.

Naturally, the operations of a terminal facility of this size have a material effect on the operations of the railways it serves and this is particularly true of train movements on the R. F. & P. If Potomac yards becomes congested, the effect on a railroad with a train every 15 minutes, would be particularly unfortunate and for that reason no effort is spared to keep this terminal in fluid condition. Although handling far more than its rated capacity for many months past, Potomac yards have maintained their record of being able to classify and dispatch trains as fast as the connecting lines can take them away, and except for one or two days last winter when bad weather conditions interfered unduly with operations, it has maintained this record, despite heavy traffic. On the in-plus-out count, 1,313,279 cars were handled through this terminal during the first six months of 1942, or more than were handled during the first 11 months of 1940. This compares with 941,607 cars handled in the first six months of 1929, and represents an increase of 39 per cent over that previous record year. An analysis of cars handled is given in Table No. 3.

During May, an average of one car passed over the northbound hump in this terminal every 38 seconds. This hump is equipped with car retarders, while the southbound hump is operated with crews of car riders and switchtenders. The number of cars handled southbound through this terminal is materially less, even under present conditions, and the percentage of empties is much greater. The figures as to humping operations in May, June and July, 1942, are given in Table No. 4.

Table 3. Cars Handled, Potomac Yards

	1940	1941	In-Plus-Out % Increase Over 1940	1942	% Increase Over 1941	% Increase Over 1940
Jan.	120,226	139,669	16	185,875	33	55
Feb.	113,237	134,457	19	186,159	38	64
Mar.	122,656	149,466	22	225,208	51	84
Apr.	117,671	146,509	25	228,954	50	95
May	133,992	164,468	23	255,738	55	91
June	125,137	153,468	23	231,345	51	85
6 Mos. Total	732,919	884,437	20	1,313,279	47	79

Table 4. Cars Humped, Potomac Yards

Week Ending	Cars Humped Northbound	Average Per Day	Cars Humped Southbound	Average Per Day
May 9.....	15,656	2,238	14,197	2,028
May 16.....	15,737	2,248	14,706	2,101
May 23.....	15,690	2,241	15,012	2,144
May 30.....	16,086	2,298	14,103	2,016
June 6.....	15,879	2,269	12,651	1,867
June 13.....	15,566	2,224	13,161	1,880
June 20.....	14,350	2,050	11,674	1,668
June 27.....	15,330	2,190	12,488	1,784
July 4.....	14,902	2,129	12,559	1,794
July 11.....	13,543	1,935	11,937	1,712
July 18.....	14,219	2,031	12,382	1,769
July 25.....	14,606	2,086	13,316	1,810

To take care of the greatly increased business handled through the yard and to provide for even more business, three construction projects costing about $500,000 have recently been completed, with others planned. These include two additional northbound receiving tracks with a capacity of 90 cars each. Also, a relay yard, with a capacity of 320 cars, has been built on the site of the former transfer facilities. A project just completed in-

volved the extension of nine tracks in the northward classification yard, including the construction of a 9-track bridge, some 200 ft. long, across a creek, and about 300,000 cu. yd. of fill in a swamp area beyond. These extended tracks converge into three outbound leads, which hold 125 cars each, beyond the classification yard switches. The extended tracks themselves will increase the capacity of the yard by about 400 cars. In all, about 11 miles of new tracks are involved.

The R. F. & P. does not plan to stop there and in anticipation of further increases, is planning an extension to the southbound classification yard at a cost of about $250,000 and an extension to the southbound receiving yard to cost about $150,000. This construction is in addition to the very heavy work that will be done in connection with the emergency railway bridge now being built across the Potomac by the Government.

Improved Terminal Operations

Potomac yards have been able to handle this increase, first, because of the new facilities constructed, but above all by studying and applying the most efficient operating methods to both the new and old facilities to obtain the maximum use therefrom. Paper work has also been studied and mechanical aids, such as Recordak machines for photographing instead of copying waybills, and a variety of other modern accounting machines have been installed. Paper work does not delay cars in Potomac yards. The terminal is also equipped with modern, underground car inspection pits that cut down the delays for this purpose.

Much has also been accomplished by the elimination of as much humping as possible. The nature of the present traffic and a certain amount of pre-classification have brought the average number of cars per cut up from 1.2 to 1.4. In a yard handling as many cars daily as this one, an increase of even two-tenths of a car per cut means a material increase in the speed and efficiency of classification.

Coal moving into the yard from the C. & O. for delivery to the northern lines en route to New England destinations is run around the hump. Oil trains are also run through the yard without humping.

One of the major factors in improving operations was the removal of the diversion privilege on perishables at Potomac yards by I. C. C. order No. 77, effective June 1, 1942. Formerly as many as 600 cars of perishables would be stored there at one time awaiting orders. These cars not only occupied valuable track room, but those that required ice had to be humped and returned to the hold yard periodically, some of them as many as three times before the billing was received. The elimination of this operation has materially increase the capacity of Potomac yards.

Personnel Problems

The efficient operations at Potomac yards insure that efficient train movement on the road will not be wasted effort. There are many reasons why the trains are able to roll over this 116-mile line in a constant procession. One of the chief reasons is constant supervision. The supervisory operating organization is small and compact. It is headed by a general superintendent whose staff includes one trainmaster and two assistant trainmasters, in addition to a superintendent, general yardmaster, yardmaster, etc., at Potomac yards.

They are in much more intimate touch with their men than would be possible on a larger system, which is doubly important under present conditions when a shortage of labor exists. The senior men on the railroad have taken a keen interest in training the new recruits, of whom about 1,000 have been employed in the last two years. These men have been mostly country boys recruited locally but it has also been necessary to raise the age limit in order to secure experienced men.

The R. F. & P. has had unusual success in holding its essential men by reason of its co-operative efforts with the local draft boards. The only officer on the R. F. & P. who is authorized to request a deferment is the president of the railway. Knowing that deferment requests are studied carefully before they are made and then handled by a responsible executive, the local draft boards have been unusually co-operative in permitting the railway to retain its key men.

The reason for the success of the R. F. & P. operation is found in the simple formula of getting trains over the railway with as few stops as possible. While this formula is simple, it requires constant watchfulness and co-operation from all departments and is made possible by the fact that a continuing program for im-

Fifty Freight Trains Per Day Roll Over the 116-Mile R. F. & P.

proving the property, involving large expenditures, has been carried out for many years. The only city of any importance on this 116-mile double-tracked line is Fredericksburg, about midway between Richmond and Washington. but this offers no handicap to operations, as the railway is elevated through this city as a result of an outlay of several million dollars some years ago.

More recent expenditures in connection with military installations along the line have included additional facilities at Accotink, the junction with the Fort Belvoir military railway, costing about $12,000; additional interchange facilities with the Chesapeake & Ohio at Doswell, of which the R. F. & P. proportion is approximately $16,000 and interchange tracks with the Navy's railroad at Dahlgren Junction, costing $12,000.

Having a modern railroad over which to operate, the R. F. & P. has always stressed the improvement of its operations to make them as efficient as possible. Despite the increase in traffic, the dispatching force has not been increased. However, the dispatchers have now been relieved of all work other than dispatching trains, and the general superintendent's office is now open 24 hr. per day to take care of work formerly handled through the dispatcher's office. The dispatching is such that if a freight train leaves either terminal as much as 30 min. ahead of a passenger train, it makes the run into the opposite terminal ahead of the passenger train in 99 out of 100 cases. No stops are made for coal and, on over 85 per cent of the freight runs, no stops are made for water. This is made possible by the use of 10,000-gal. auxiliary water tanks or a total capacity of 20,000 gal. Delays are further avoided by a 4½-mile passing track at Fredericksburg in the middle of the railroad, which permits passenger trains to overtake and pass freight trains while the latter are running through this long track, thus avoiding delays to both trains.

If the number of cars and the number of trains required to handle this freight and passenger traffic were increased in proportion to the increase in traffic, the problems of the R. F. & P. would be highly complicated. However, although the railway handled an increase of 77 per cent in tonnage in the first six months of 1942, as compared with 1941, freight train miles increased only 52 per cent in the same period. This was brought about to some extent by handling more cars per train, but the fact that the tons per loaded car have increased 13 per cent over 1941, has also been extremely helpful.

In the first six months of 1942, the R. F. & P. handled 93 per cent more passengers than in the same period of 1941, with an increase in passenger train miles of only 9 per cent. The movement of heavily loaded troop trains contributed greatly to this showing, but figures of passenger traffic, exclusive of special troop trains, give interesting testimony to the passenger-carrying ability of this railway. In the first six months of 1942, as compared with 1941, increased regular travel (including soldiers on furlough but not special troop movements) brought about an increase of 45 per cent in the number of passengers per passenger-carrying car bringing the figure from 19 to 28.

The passengers per train are now averaging 204, an increase of 53 per cent over last year, while the passenger cars per train have increased only 3 per cent. As might be expected, certain trains are running extremely heavy. An interesting example is No. 16, leaving Richmond at 4:15 p. m. and arriving at Washington at 6:40 p. m. This train has a close connection with a Norfolk & Western train from the busy port of Norfolk, Va. In June, 1942, No. 16 carried an average of 509 passengers from Richmond to Washington, as compared with 188 in June, 1941, while the total passengers carried during June, 1942, were 15,263 as compared with 5,636 in June, 1941, an increase of 171 per cent.

Locomotive Utilization

The R. F. & P. owns 81 locomotives and, until 16 new locomotives scheduled for delivery this fall are received, has rented 7 locomotives for road service from other railways. With close to 100 trains a day moving on the railway, and deducting from the total the switch engines used in Potomac yards and Richmond and some small type locomotives, it will be seen that the maximum use of every locomotive is essential. Fortunately, the motive power was in excellent condition before the big rush of traffic came. Few are in the shops at any one time and, as a matter of fact, last June, every locomotive owned by the R. F. & P., that was suitable for hauling through passenger and freight trains, was in service throughout the month, during which a total of 1,367 passenger and troop trains were operated. The fact that eight passenger trains daily are powered by foreign line Diesel-electric locomotives was of considerable assistance in easing the passenger power situation.

During June, one group of 12 of the newest engines of the 4-8-2 type averaged 221 miles a day in freight and passenger service. In the same month 57 locomotives in all types of service except switching averaged 171 miles per day. Locomotives used exclusively in passenger service averaged 200 miles per day and those in through freight service averaged 175 miles per day.

The prevention of all but scheduled stops by passenger trains and the endeavor to run all freight trains through without stops has been largely responsible for this excellent locomotive utilization record. The ideal toward which the R. F. & P. is striving is a round trip each day between Richmond and Washington for locomotives in passenger service and a round trip between Richmond and Potomac yards for locomotives in freight service. The above figures show that they were not very far from this ideal during June.

Communication . . .

Troops Deserve More Considerate Treatment

St. Louis, Mo.

To the Editor:

I am interested in the editorial, "Soldiers' Good Will," in *Railway Age* of November 7. As one of these troop-train riders, I recently escorted a train with a large number of men and officers, a major general being in charge.

From conversation, I gathered he had had a not-so-good run, but no complaint was made of this. What did he complain of? The fact that his train was held three hours in the yards at a large terminal. Many of his men were from that area, wanted to telephone their people (to which this general apparently had no objection) but were continually cautioned not to get off the train as it would be "moving in a few minutes." The few minutes actually grew to three hours—at least, that is what the general advised me.

Some terminal trainmaster, general yardmaster, or other terminal officials certainly passed up a splendid opportunity to make a real impression on this general and his men.

Sorry, but where did you get the information that all troops on official travel ride in Pullmans? I have ridden many troop trains composed entirely of day coaches and some of them on rather long hauls.

E. E. J.

Railroads-in-War News

Margin of Safety Dangerously Close

Eastman says railroads have little reserve strength left for emergencies

"There is no sounder rule in war than to be ready for the worst, and our domestic transportation is dangerously close to the margin of safety," said Joseph B. Eastman, director of the Office of Defense Transportation, in an address December 2 before the California State Chamber of Commerce in Los Angeles. "We shall never forgive ourselves if transportation should at any time fall down on its vital war job for any reason that could have been avoided. We do not know all that the future holds forth, but some things we do know," he continued.

"For example, it is certain that troop movements, which are already a heavy burden on the railroads, will for a long time continue to increase in volume and frequency. It is certain that our rubber-borne transportation will continue to shrink in capacity. It is certain that our productive activity has not yet reached its peak, nor the traffic which it creates. It is certain that the needs and hazards of war have already thrown heavy burdens on the carriers which were not foreseen, and that they may well bring like heavy and unforeseen burdens in the future. It is certain that the carriers are driving their equipment, and particularly their motive power, to the limit and have very little reserve strength left. It is certain that they will soon be faced generally with serious manpower troubles, which have already arrived in this territory."

Mr. Eastman led up to these remarks with a brief outline of the domestic transportation problem in general, pointing out that "this is basically a war of productive capacities and of course, also, transportation is the life blood of modern production. They stand or fall together." This, the speaker added, "is as true of the transportation of persons as it is of the transportation of property."

At another point in his address the ODT director stressed the contrast between government policy toward the railroads in this war and in World War I. "In this war," he said, "the government is following a policy of co-operation with the carriers. It is trying to retain the benefits of their own initiative and enterprise, and at the same time give them leadership, and also lend them help through the exercise, especially, of powers which will enable the elimination of waste effort and the concentration of energies."

Referring to other phases of the transportation problem, Mr. Eastman emphasized the importance of keeping private automobiles running to handle the major part of the local traffic load. This problem of local passenger travel is, he remarked, a worse problem than intercity travel, which so far has been handled by the railroads and buses "surprisingly well, although with occasional overcrowding and increasing discomfort for the passengers." He added, however, "there is trouble ahead." To forestall this as far as possible, in order to avoid "positive and enforced control over travel," he called for co-operation on the part of non-essential travelers, particularly over weekends and holidays.

The worst problem of all faced by the ODT, the speaker stated, is to keep the country's motor trucks in service. "They have relieved the railroads of much of the freight which it is most difficult for them to carry, and in fact the railroads now use trucks extensively as auxiliaries in their own operations. They would be in a bad plight, if we should lose the trucks." Again he emphasized his dislike for General Order ODT No. 21, requiring Certificates of War Necessity, but stressed his conviction that it was an essential step in the conservation of truck transportation.

Mr. Eastman concluded his remarks with a reference to the public criticism of many government policies and regulations. "There seems to be some feeling throughout the country," he said, "that Washington is full of over-zealous bureaucrats who delight in the exercise of their authority, are devotees of regimentation, and are keen to place the populace in the bondage of various and sundry regulations, regardless of whether there is any need therefor. I shudder to be placed in such a class, because it runs counter to my life-long tendencies, hopes, and beliefs. Nor do I think that my fellow officials can fairly be so regarded; and I am a rather impartial witness."

War Plants Get Christmas Off

In a statement issued November 27, Donald M. Nelson, chairman of the War Production Board, said "I hope that in all war plants where it can possibly be done Christmas Day this year will be observed as a full holiday. After the holiday, we must drive ahead with renewed energy for the increased production job of 1943." It has been necessary to make even such holidays as Labor Day and July 4th "days of steady unbroken production" to meet the need for munitions and essential war materials, Mr. Nelson pointed out, but he expressed the feeling that Christmas Day "should be the one exception to the rule which has been observed thus far."

RR Oil Movement Near Peak—Pelley

Power scarcity emphasized to House members studying petroleum problem

It does not appear likely that the average daily movement of petroleum by tank car into the northeastern territory during the winter months will exceed around 800,000 barrels, J. J. Pelley, president of the Association of American Railroads, informed members of the House of Representatives committee on interstate and foreign commerce at a hearing November 30. Mr. Pelley was one of a number of representatives of transportation and government agencies concerned with petroleum movement who appeared in the course of the committee's investigation of oil movement and rationing programs and practices.

In supplying the committee with figures to show the weekly record of carloadings and daily average of barrels moved by rail since September 20, 1941, Mr. Pelley pointed out that the current average is a little under 800,000 daily, and called attention to the difficulties that severe weather introduces into railroad operation. The controlling factor in determining railroad capacity at present, however, he emphasized, is the "tight" motive power situation. Committee members inquired whether shortages of critical materials had affected the delivery of new locomotives, and were informed that the railroads already are short some 450 locomotives they had hoped to get by this time because materials were not available for their construction.

So far the railroads have moved all the tank cars that have been loaded and billed, Mr. Pelley remarked, and they have no control over the number of cars loaded or their destinations. At present, he said, there are about 1,400 freight locomotives, or 5.5 per cent of all the railroads' freight locomotives, engaged in moving oil that were working or available for work in other freight service a year ago.

The peak figure of 856,710 barrels a day reached in the week of September 19 has not been equalled since for a number of reasons, Mr. Pelley stated. Aside from delays due to floods, accidents, and an increase in bad order tank cars, two important factors that have been beyond the control of the railroads have been the decrease in the quantity of petroleum shipped east from the Chicago area and the diversion of some 4,000 tank cars from the northeastern oil movement to other emergency traffic, such as vegetable oils, molasses, alcohol and acids. Most of these cars

(*Continued on page 934*)

How Car Shortage Has Been Averted

Better use of equipment has, in effect, added 190,000 cars, 3,500 locomotives

That no breakdown in transportation has occurred during this war is due, in a large measure, to the excellence of railway management and operation, V. B. Boatner, director of the Division of Railway Transport of the Office of Defense Transportation, told the Illinois Manufacturers Association at the Missouri Athletic Club in St. Louis, Missouri, on November 20. Mr. Boatner, in his remarks, claimed no miracle in the outstanding transportation performance thus far rendered by the railroads, but pointed to the high spirit of co-operation among the railroads, the ODT, the shippers and receivers of freight, and the truck lines as factors in the expeditious movement of America's war freight.

Mr. Boatner said in part:

"The success the railways have achieved in handling the burdens that have been imposed upon them is forceful evidence of the high degree of excellence of their management and operation. Despite the fact that in many respects this burden upon the railroads has been unprecedented, there has been, up to now, practically no shortage of railroad transportation, and little deterioration in the character of service rendered. The load is being carried with about a fourth less cars and a third less locomotives than were used to carry a considerably smaller ton-mile and passenger-mile load in the most prosperous years preceding the depression, or, in fact, ever before.

"The question arises as to how this has been accomplished. First, there has been the full realization of large expenditures for expansion and improvements that were just about completed at the end of the prosperous 20's. Second, the great expansion in the utility of the motor truck has relieved the railroads of a lot of burdensome performances of intra-terminal services. The truck also has relieved the railroads of much assembling and distributing service in both main and branch line operations, thereby leaving the rails free to devote their energies to the major movements. Third, the character of present traffic and its transport requirements differ from normal traffic in that it moves long distances and originates and terminates, in considerable measure, at large centers where facilities for handling and distribution usually are the most adequate.

"Obviously, the handling of this great volume of traffic has heavily taxed facilities and equipment, and at times the situation has been strained. Nevertheless, we have passed the peak month of carloadings, in which period weekly loadings were slightly lower than during the same period in 1941. On the other hand, despite the decrease in carloadings, the load upon the railroads in ton-miles was some 30 to 35 per cent greater than it was a year ago. The car surplus last year during the peak loading week amounted to, roundly, 40,000 cars, whereas at the peak in October this year, when loadings were some 14,000 cars less, the surplus was only, roundly, 29,000 cars, and for the week ended November 7, when the loading had decreased to 829,000 cars, the surplus was only 35,000 cars.

"These small surpluses hardly give sufficient margin to accommodate car distribution without shortages. Even so, the utilization of equipment has been conducted in the most efficient manner in history, both by the railroads and by the public who load and unload the cars. By voluntary action on the part of the majority, and pressure on the others, the users of cars have loaded and unloaded more rapidly than ever before.

"If certain innovations and methods had not been installed it would have required 190,000 more cars to handle the traffic in October of this year than were actually used. Since we now have a surplus of only a fraction of that total, a serious deficiency would have resulted.

"In our worst car shortages of the past the shortages were not this large. On the other hand, if cars had been available and loaded in October, 1942, as they were in 1941, and dispatched and released correspondingly, carloadings for the peak week of October would have approximated 1,100,000 instead of the 909,000 actually handled. In the first case the car shortage would have been so great that industrial output would have been seriously reduced, costs greatly increased both to industry and railroads, and general confusion would have resulted. Thus, the war effort would have been seriously impaired.

"In the second case, if the cars had been available and loaded and handled as in 1941, producing approximately 1,100,000 carloads, weeks of congestion would have resulted and we would now be in about the same position in which we found ourselves in the latter part of 1917. Either situation would have been disastrous under conditions now existing. Concurrently, by the reduction in unserviceable locomotives as compared with September, 1941, and the increase in load per train-mile, all of us working co-operatively have added to the locomotive supply the equivalent of 3,500 locomotives, which has likewise had a far-reaching effect."

WPB's Steel Division Establishes Transportation Section

In a move "to aid in the elimination of wasteful transportation practices in the steel industry," the Steel Division of the War Production Board has established a Transportation Section. The announcement by Steel Division Director H. G. Batcheller listed "unnecessary cross-hauling, excessive long hauling and the loading of undesirably small quantities of material into freight cars" among the practices which the Section will attempt to eliminate.

It will serve as the contact point of the Division with WPB's Stockpiling and Transportation Division, and will "work with America's steel producers to solve freight traffic problems." E. G. Plowman, traffic manager of the Colorado Fuel & Iron Corporation, has been named chief of the Section.

'33 RFC Pay Cuts Were Precedents

Roosevelt rationalizes today's $25,000 limit from RFC lid on borrowers

Precedent for the fixing of salary ceilings by administrative action has been found by President Roosevelt in the salary-reduction conditions which the Reconstruction Finance Corporation attached to loans granted railroads during the depression years. He cited the precedent on the course of a December 2 press conference discussion of that phase of the executive order creating the Office of Economic Stabilization which called upon OES Director James F. Byrnes to establish the present $25,000 a year ceiling on salaries after payment of taxes and other specified obligations.

In the latter connection Mr. Roosevelt emphasized that the ceiling, being a net figure after allowable deductions, actually permits an individual to receive a gross annual salary of $67,200. He then went on to recall in considerable detail what happened with respect to railroad executive salaries at the hands of RFC.

In 1933, he said, most of the railroads would have been busted if it had not been for the Reconstruction Finance Corporation Act. During the period when the loans were being made, the then RFC Chairman Jesse H. Jones, now secretary of commerce, came to the President and expressed the view that some of the railroad salaries were too high, running to $150,000 a year with a probable average of $100,000 for railroad presidents and board chairmen.

Mr. Jones went on to express the view that such salaries should not be paid by roads receiving government loans; and the President said he expressed agreement, asking Mr. Jones what should be the limit. The RFC chairman suggested $50,000 a year, and the President came back to ask how such a limit would be enforced, since it was not provided for in the law. Whereupon Mr. Jones said that he was the lender of the money, and could make such terms as he desired. Then, as the President put it, there was an awful howl on the part of railroad executives, the RFC action being appraised as perfectly terrible. So he asked Mr. Jones what should be done next; and the RFC chairman thought that if the limit were raised to $60,000 everything would be all right. As the President recalled the situation, this was done; and then, he said, every president of every railroad except one agreed to the adjustment in the interests of his stockholders.

That, the President added, was a $60,000 limit when bankruptcy of the railroads was threatened. The present ceiling is $67,200 when the country faces bankruptcy if it should lose the war.

As noted in the *Railway Age* of June 3, 1933, page 809, the RFC policy with respect to salaries paid officers of borrowing railroads was at that time outlined as one calling for reductions on a sliding

scale. Salaries of more than $100,000 were to be cut 60 per cent; those between $50,000 and $100,000, 50 per cent; and so on down to salaries between $4,800 and $10,000 which were to be cut not less than 10 per cent. In all cases, the reductions ordered by RFC were to include previous reductions, which had already been substantial on several roads. Later in 1933, Joseph B. Eastman, who was then federal co-ordinator of transportation, brought about a general $60,000-a-year limit on salaries of rail executives. As noted in the *Railway Age* of September 2, 1933, page 335, the co-ordinator did this "without issuing an order and by merely requesting it, with a suggestion that the law gives him authority to require salary reductions on the theory that salaries too large represent 'wastes and preventable expense.'"

I. C. C. Control of Grain Shipments to Continue

Responding to requests of the Office of Defense Transportation and the Department of Agriculture, the Interstate Commerce Commission has extended from December 31 until April 30, 1943, the expiration date of Service Order No. 80 which provides for the present permit system for handling grain crops.

B. & M. to Stage Seamen's Benefit Ball

On Thursday evening, December 10, the management and all the standard labor unions of the Boston & Maine will stage a gigantic War Bond victory ball and entertainment at the Boston Garden, the proceeds to be turned over to the United Seamen's Service (U. S. Merchant Marine). Governors of all four of the New England states served by the road will be the evening's guests of honor.

ODT Order No. 18 Certification Requirements Relaxed

An amendment to General Order ODT No. 18, issued December 2, simplifies the certification required of shippers of carload freight that does not meet the load limitations provided in that order. Shippers are still required to certify on the shipping instructions or bills of lading all loading exceptions provided by ODT general or special permits, or by permits issued by railroad officers or agents under the provisions of the order, but they are not required to make such certifications when the exemptions permitting the exceptions are provided in the order.

OPA Report Reviews Action Against Rate Increases

The report of the Office of Price Administration for the second quarter of 1942, presented to Congress November 28, covers a period, Administrator Leon Henderson says, in which that agency was "left to hold the line alone" against "basic inflationary forces," a situation altered as he points out, by the Price Control Act of October 2. On the subject of transportation rates the report states that the OPA had no authority during the second quarter to exercise direct control in these fields. Nevertheless, it adds, OPA did attempt "to prevent unwarranted rate increases by filing protests, submitting briefs, and appearing before both federal and state agencies having jurisdiction. . . . As a result of these protests the Interstate Commerce Commission in several cases suspended announced advances and conducted hearings."

The OPA also was instrumental, the report continues, "in securing reduction of the minimum weight of iron and steel scrap required to qualify for carload shipment rates in certain areas. . . . The proposal was submitted to the railroads and supporting evidence prepared and set before the appropriate railroad officials. In the majority of the cases the railroads agreed to establish lower minimum rates."

Making Friends of the Men in Uniform

Troops who travel on the Burlington are receiving two pieces of literature (where the troop train commander consents), designed to make their trip more interesting. One is a reprint of the profusely-illustrated article, "The Iron Horse Delivers the Tools of War," from Popular Mechanics Magazine. This article gives specific information on the various phases of railroad service to the war program—and should serve to make a train trip more interesting by helping the passenger to interpret for himself the significance of the things he observes through the window.

The other piece of literature the Burlington distributes has nothing to do with railroading—it is a reprint from the American Magazine entitled "So You Think You're Clever," and consists of 30 "brain teasing" questions, with answers; topped off with some interesting historical facts about the Burlington.

Service Men Won't Overload Holiday Trains

Following ODT Director Joseph B. Eastman's request that government departments and agencies in Washington cooperate with the "don't travel" program by denying leaves to employees who intend to travel during the Christmas or New Year holiday periods, as reported in *Railway Age* of November 14, the War Department on November 27 issued a statement outlining procedure to be followed during the holiday period in granting furloughs to service men.

"Movements by rail of military personnel," the statement points out, "have reached approximately 1,600,000 per month, as compared with less than 1,000,000 in June." Orders have been issued to commanding officers at all Army posts, camps and stations to regulate passes and furloughs during the holiday period "to conform with available transportation. Furloughs during the holiday period "to conperiod from December 12 to January 12, inclusive, to more than 10 per cent of the enlisted strength" of the unit involved, and they "will be so arranged as not to permit travel to or from military reservations on December 24 and December 25." Similar restrictions apply to passes for Christmas Day and January 1. "Schedules of furloughs, showing the general destination areas, and times of departure and return, will be furnished to local railroad representatives. Where it is found that available rail transportation is not sufficient to meet the number of furloughs and passes indicated in the schedule, the local commander will reduce the schedule of furloughs and passes accordingly."

I. C. C. Service Order to Relieve Congestion on S. P.

The Interstate Commerce Commission, Division 3, on November 28 issued Service Order No. 98 directing the Southern Pacific, the Denver & Rio Grande Western, the Union Pacific and the Utah to divert via the U. P. from Salt Lake City, Utah, or Ogden, or points east thereof, to destinations in or beyond Washington and Oregon, cars loaded with coal originating on or moving via any of those roads and routed over the S. P. to destination in or beyond the above states.

The commission's order stated that an emergency existed "due to interruptions of normal traffic and accumulation of railroad cars on the line of the Southern Pacific Company and accumulations of cars for delivery to and movement via the Southern Pacific Company."

A few days later, on December 1, the commission amended the order to except from its provisions "cars loaded with coal for destinations on the Southern Pacific south of Oakridge and Roseburg, Ore."

"Progressive" Demurrage Rates on Reefers in Canada

T. C. Lockwood, transport controller for the Dominion of Canada, Montreal, has issued an order requiring owners and operators of refrigerator cars to charge for failure on the part of shippers or consignees to release or issue disposal orders on refrigerator cars within a 36-hour time limit (exclusive of Sundays or statutory holidays). The penalty has been set at $5 for the first 24 hours of delay, $10 for the second 24 hours, and $15 for the third and each succeeding 24 hours.

In addition, refrigerator owners and operators have been ordered not to accept cars which have not been loaded to prescribed minimum weights (variously set at from 20,000 lb. for cantaloupes up to 45,000 lb. for potatoes) unless specifically authorized by the transport controller, and to make provision for handling broken or damaged packages so that release of the cars will not be delayed.

Roosevelt Compliments Railroad Service on His Trip

In an exchange of complimentary letters between Stephen Early, secretary to President Roosevelt, and J. J. Pelley, president of the Association of American Railroads, following the conclusion of Mr. Roosevelt's 8,396-mile rail tour around the country inspecting war industries, the

President's pleasure in the trip and appreciation of the work of the railroad men responsible for its success were represented as the opinion of a "record-breaking traveler," who never before "moved from coast to coast, from border to border, with as much ease and comfort, rest and enjoyment."

The text of the letters was made public by the Association of American Railroads to accomplish the intention expressed by Mr. Pelley in his reply that he wished to convey the President's impressions not only to the railroads and men directly concerned in the trip, but also to the other railroads of the country, because "each and every one of them would have endeavored to furnish just the same sort of service."

16 Per Cent of British Railway Employees Are Women

According to the British Supply Council in North America, the British main line railways and the municipally-owned London passenger transportation system at present employ over 105,000 women in a great variety of jobs—equivalent to about 16 per cent of the total railway personnel of approximately 639,000.

At the end of 1916 over 46,000 women were employed. By the end of World War I this number had increased to about 65,000, or roughly 10 per cent of total railway employees. In 1939 the total was 27,000, or about 4 per cent.

In peacetime the British railways employ women mainly for such jobs as waitresses in station restaurants, for cleaning and clerical work and certain jobs in shops. Today women are employed in practically every department—in both skilled and unskilled jobs in shops, as ticket clerks in stations, ticket collectors, in signal towers, on track work, in repairing, lubricating and watering engines, and for road transport in connection with the railways. However, they have not as yet been permitted to act as enginemen or trainmen.

Eastman Further Discourages Passenger Travel

A letter of ODT Director Joseph B. Eastman to officers of major league baseball clubs, made public November 30, called attention once more to his conviction that voluntary reductions of non-essential travel are the only means of avoiding regulations intended to bring about that result. "Our military transportation requirements are increasing so rapidly," he said, "that it is apparent the carriers will be unable to meet the passenger transportation requirements during the coming months unless the demand for passenger accommodations can be lessened."

Mr. Eastman suggested several measures that major league baseball clubs might adopt to reduce their travel requirements. Spring training might be minimized, he said, and pre-season games might be eliminated or drastically curtailed. During the regular season long duplicate trips might be avoided, and schedule revisions might reduce the number and length of trips made by each team. He also proposed that coaches be used instead of sleepers for many trips, and asked that ample traveling time be allowed to provide for train delays or "lack of accommodations."

"In writing this letter," Mr. Eastman concluded, "I am basing my suggestions on conditions as we see them at present. Improvement and easing of the situation is not likely to occur. Frankly, I must tell you that even the foregoing steps may prove to be insufficient in the light of the experience in the months to come; accordingly this letter cannot be taken as a guarantee of the future."

On the following day Mr. Eastman made public a letter to public school officials in certain Iowa counties in which he set forth reasons why exceptions cannot be made to ODT rubber conservation measures to permit school buses to be used for sports events.

Managers of New Year's Day football games at "bowls" in different cities and athletic chairmen of schools scheduled to take part in such games were sent identical telegrams December 2 by Mr. Eastman in which he urged that distribution of tickets to the games be confined to the area in which they are to be played, since "long distance travel of fans and team followers must be discouraged."

Eberstadt Calls Railroads Vital to War Effort

"It is just as vital to keep our railroads operating as it is to launch war ships," said Ferdinand Eberstadt, program vice chairman of the War Production Board, in an address December 2 at the annual convention of the National Association of Manufacturers in New York.

The speaker's remarks dealt chiefly with the Controlled Materials Plan, under which he expects certain scarce essential materials to be allotted to industry in the amounts and at the time required to maintain a steady production of the finished goods essential to a war economy. His reference to the railroads came in connection with his assertion that a civilian economy "in a sound, healthy condition" is an essential part of a balanced program for war production.

Mr. Eberstadt pointed out a number of features of the plan which he considers benefits to industry, and appealed for confidence in it and the "gentlest" judgments "of the degree of confusion, intricate regulations, and conflicting instructions" that have "necessarily accompanied" substantially all-out war production.

Lake Ore Movement Nearing Goal Set by WPB

Iron ore carriers on the Great Lakes had brought down 91,338,000 gross tons as of November 29, and the Office of Defense Transportation has made arrangements for stretching the shipping season into December with the hope exceeding the latest War Production Board goal of 91,500,000 tons for the 1942 season. ODT Director Eastman reviewed the record in a December 3 statement which pointed out that the total movement is already 14 per cent ahead of 1941's 80,116,360 tons, and 43.4 per cent above 1940's 63,712,983 tons.

Among the arrangements made by ODT for extending the shipping season are those under which the War Shipping Administration will handle post-season insurance, and others under which the Office of Price Administration will permit increases in shipping rates to meet the higher costs of winter operations. The rate advance permitted by OPA will amount to 31.25 per cent, which, the ODT statement said, "is expected to cover only the carriers' additional out-of-pocket costs of December operation."

Transportation of the 162,000 tons required to reach the goal, the statement went on, will depend to a considerable extent on the weather. In only two of the seasons for which reports are available—1916 and 1917—was ore loaded on Lake Superior or at Escanaba, Mich., after December 8; and the average December movement since 1916 has been about 80,000 gross tons.

RR Oil Movement Near Peak—Pelley

(*Continued from page 931*)

will be returned to petroleum service by the first of the year, however, he said.

"The average time en route from points of origin in Texas and Oklahoma to destinations in the east is between five and six days," Mr. Pelley stated. "The average time from points of origin in Louisiana, Mississippi and Arkansas to similar destination is slightly over five days. The average time from points of origin in Illinois, Indiana and Ohio is slightly over two days. These schedules constitute fast freight service in its truest sense and they are comparable with schedules for the movement of livestock and perishables.

"Progress has been made in organizing into train-lot movement the empty cars from point released to producing areas. This presents more of a problem by reason of the assembling of empty equipment from scattered destinations into the larger blocks in which empty cars can be handled."

Mr. Pelley gave the committee a list of over sixty symbol schedules worked out by the railroads, the Office of Defense Transportation and the oil companies to move train lots of petroleum from southwestern producing areas and central western pipeline terminals to eastern seaboard destinations. "Some difficulty in arranging for large blocks of cars for operation in symbol trains has been found," he pointed out, "due to the apparent inability of the oil companies to so arrange their shipments that there will be full train lots from one point of origin to one destination. This has meant a scattering of the cars en route to some degree and increased delays in the handling of such cars are, therefore, inevitable.

"Efforts are being made constantly to improve this situation, arranging for con-

solidations which will result in a greater number of cars in a single block from one point of origin to one destination. Particularly is this scattering of shipments true with respect to gasoline and fuel oil for domestic purposes, destined to various centers of population in the eastern areas, when train lots would not be practicable by reason of lack of unloading or storage facilities."

In his formal statement to the committee and in answer to questions, Mr. Pelley emphasized the vast expansion in long haul oil movement the railroads have accomplished, comparing the present weekly movements into the northeastern states from the southwest with pre-war conditions under which there was practically no traffic of this kind.

"The subject of the handling of petroleum in the most efficient and satisfactory manner for all interests is one of constant concern to the railroads," he said. "Special meetings have been held by the chief operating officers of all roads having to do with this movement so that nothing may be left undone to give it preferred attention, second only to the movements of the Military. The matter of schedules for these trains is one of constant review. Special effort is concentrated in mechanical inspection of cars engaged in the movement that set-outs may be minimized and delays to individual cars and to trains thereby avoided."

Some of the limiting factors that prevent continued increases in the weekly movement of petroleum by rail to the Atlantic seaboard from the producing areas were outlined to the committee by Henry F. McCarthy, director of the division of traffic movement of the Office of Defense Transportation. The present record is the result of full co-operation between his office, the railroads, and the Office of the Petroleum Co-ordinator for War, Mr. McCarthy informed the committee. The ODT has complete powers over the carriers and shippers to make effective any action necessary, he added, and needs no other powers to accomplish its duties.

The ODT staff expects the daily average of petroleum movement by rail into the northeastern area to approach 850,000 barrels, Mr. McCarthy said, and he mentioned opportunities for further improvements in the efficiency with which oil shipments can be handled. There has been actually a considerable improvement in oil train efficiency since September, when the existing record weekly movement was handled, he declared, but this has been obscured in the report of shipments because the total loadings have been held down by variable conditions not under the control of the railroads, such as bad weather, troop movements, diversion of cars to other traffic, and a diminished supply of oil at relatively nearby points, such as the Chicago area.

Faster handling of empty tank cars is the best opportunity open to the railroads to improve their record in moving petroleum, Mr. McCarthy suggested, while the oil companies, shippers and consumers can speed tank car turnarounds by further efforts to pool shipments. Among conditions currently unfavorable to the establishment of new records in handling tank cars, he mentioned the effect of winter weather on yard operations, the effect of cold on locomotive capacity, especially through increased frictional resistance, and the possibility that the manpower shortage will interfere with normal programs for clearing highways of snow, with the result that tank cars will have to be diverted into short haul service to replace trucks.

The symbol train schedules presented to the committee by Mr. Pelley were the result of many considerations, Mr. McCarthy explained, among them the motive power situation, terminal facilities and other essential traffic on the different available routes, and the necessity of co-ordinating troop movements in both the producing areas and the seaboard terminal areas with the oil movements. The ODT is now engaged in rescheduling some of these symbol movements, he said, to adapt them to winter operating conditions.

Among the symbol schedules included in Mr. Pelley's report to the House committee were several that involve solid train movements for distances of more than 2,000 miles. Symbol 32, for example, is handled by the Texas & New Orleans from Chaison, Tex., to Sherman, 405 miles, in 23½ hrs.; then by the St. Louis-San Francisco to St. Louis, Mo., 645 miles, in 38 hrs.; switched by the Terminal R. R. Association of St. Louis to East St. Louis, Ill., in 4 hrs.; then taken by the Wabash to Huntington, Ind., 313 miles, in 19 hrs.; by the Erie from Huntington to Maybrook, N. Y., 800 miles, in 42 hrs.; and finally by the New York, New Haven & Hartford to Providence, R. I., 235 miles, in 13 hrs.; a total of 2,398 miles in 139½ hrs.

Another schedule, symbol 52-B, originates at Texas City, Tex., and Houston, and travels by the Missouri-Kansas-Texas to St. Louis, Mo., 1,073 miles, in 50 hrs.; is switched to East St. Louis, Ill., in 4 hrs. by the Terminal R. R.; then moves by the New York, Chicago & St. Louis to Buffalo, N. Y., 716 miles, in 42 hrs.; from Buffalo to Binghamton, N. Y., by the Delaware, Lackawanna & Western, 204 miles in 13 hrs.; then by the Delaware & Hudson to Mechanicville, N. Y., 147 miles, in 6 hrs.; and finally by the Boston & Maine from Mechanicville to Portland, Me., 268 miles, in 14 hrs.; a total of 2,408 miles in 129 hrs.

Statements concerning petroleum transportation problems also were presented to the House committee by representatives of other ODT divisions and by members of the staff of the Petroleum Co-ordinator for War. In addition to rail transportation the committee inquired into the present condition and future prospects of truck, waterway and pipeline movement of oil and gasoline, and heard comments on the effects of material and manpower shortages, rationing programs, highway speed limits, and state highway "traffic barriers" on the oil traffic handled by these carriers, not only from officers of the government agencies, but also from representatives of the carriers.

At sessions of the committee last week government policies on nation-wide gasoline rationing as a means of conserving rubber and on the production of synthetic rubber were outlined by W. M. Jeffers, rubber director of the War Production Board, and his aides. Petroleum Co-ordinator Ickes and members of his staff also appeared before the committee to discuss the pipeline and barge transportation situation. Members of the committee and other members of Congress who appeared before it expressed great dissatisfaction with the current gasoline and fuel oil rationing program and also criticised some of the arrangements for administration of petroleum transportation matters.

A special Senate committee investigating the national defense situation, the so-called Truman committee, also delved into the petroleum rationing situation last week, and heard Mr. Ickes, Mr. Jeffers, Price Administrator Leon Henderson, and ODT Director Joseph B. Eastman explain the program and the parts played in it by their respective agencies. Mr. Jeffers went into some detail in emphasizing the uncertainties involved in this stage of the synthetic rubber undertaking and pointed out that the October crude rubber stockpile in the United States was 465,232 tons, while current consumption is at the rate of 29,000 tons per month.

It is evident, Mr. Jeffers added, that there are "rough spots" in the gasoline rationing set-up. In fact, he added, "I have already directed Mr. Eastman, director of ODT, and Mr. Henderson, the price administrator, to make some changes in their handling of rationing for farmers and workers in war plants. I suggested to Mr. Eastman that farmers and stockmen generally have a very necessary use for trucks and that pending ironing out of local difficulties they should be given to understand that they are to continue their normal operations."

East Coast Oil Shipments Down

Tank car shipments of petroleum products to the East Coast area during the week ended November 21 averaged 768,749 barrels daily, a decrease of 2.1 per cent from the previous week's daily average of 784,921 barrels, according to Petroleum Co-ordinator Ickes. Meanwhile Mr. Ickes as solid fuels co-ordinator also announced that all-rail coal shipments into New England during the November 21 week totaled 5,781 carloads or approximately 317,955 tons, an increase of 217 carloads or 11,935 tons as compared with the previous week.

Pipe-line facilities for an additional daily movement into the East Coast area of 27,000 barrels of crude oil will be available in the near future, Mr. Ickes said in a November 28 statement. Additional capacity of 20,000 barrels will become available as a result of the reversal of the Tuscarora line, which extends from Nogley, Ohio, to Bayonne, N. J., while the other 7,000 barrels will come in as a result of adjustments on other lines.

Another recent statement from Mr. Ickes' offices said that the "world's largest 'in-transit' barge terminal" now being built at the Bayway, N. J., terminal of the Standard Oil Company of New Jersey will "assure New England a minimum

daily barge movement of 100,000 barrels of burning oils this coming winter"; and it will "shorten turn-around time for some tank cars and also save them from New England's winter weather." Mr. Ickes added that cost of this terminal "has been no obstacle to its construction, as can be seen by the fact that the Pennsylvania Railroad is spending $500,000 and the Standard Oil Company of New Jersey is spending another $500,000 to put tank car and barge loading facilities into shape."

No oil brought to the terminal by tank car will go to permanent storage, most of it being marked for "on-movement" to New England. This New England barge plan, Mr. Ickes further explained, "is being undertaken because the Office of Petroleum Co-ordinator does not feel safe in counting upon substantial improvement in tank car deliveries. . . . With considerable amounts of burning oil going to New England by barge, it is expected that fewer tank cars will be terminated in New England."

Mr. Ickes also spoke up as solid fuels co-ordinator last week to urge coal producers and ship operators to continue moving coal on the Great Lakes as long as possible. Just as the Office of Defense Transportation did with respect to the post-season ore movements, so did the solid fuels Co-ordinator arrange with the War Shipping Administration to keep insurance rates at seasonal levels during December. As of November 15, the lake carriers had moved 45,753,645 tons of coal, as compared with 47,238,869 tons last season. The reduction, Mr. Ickes explained, was caused by the diversion of coal-carrying vessels to the iron ore movement.

Suspends Tariffs Designed to Ease Operations under ODT Orders

What the railroads regard as tariff changes reasonable and necessary to facilitate operations under the Office of Defense Transportation's maximum loading orders for carload and l. c. l. freight have been suspended by the Interstate Commerce Commission from December 1 until July 1, 1943. The railroad proposal would involve cancellation for the duration of the war and six months thereafter of Rule 15 of the Consolidated Freight Classification, and revision for the same period of Rules 16 and 33.

Rule 15 forbids higher charges on l. c. l. shipments than on carload shipments, providing that if the weight of an l. c. l. shipment is less than the carload minimum, while the charges computed at the l. c. l. rate would be higher, then the carload minimum charge shall be observed as a maximum. The proposed change in Rule 16 would eliminate the reference therein to Rule 15; while the proposed revision of Rule 33 would add a provision reading as follows: "Carrier will not check, tally or assist in loading or unloading except where tariff of carrier at point of origin or destination, as the case may be, provides for loading or unloading of carload freight by carrier."

Coming through promptly with a petition asking vacation of the suspension orders, the railroads, through Walter J. Kelly, assistant to vice-president, Association of American Railroads, stated among other arguments that the carriers had been informed that ODT and the Office of Price Administration had advised the commission that they would not seek suspension of the tariffs. Previously Mr. Kelly had answered petitions of protestants, stating that the arguments in such petitions against the cancellation of Rule 15 had been answered in whole or in part by the accompanying proposals to revise Rules 16 and 33. Under the proposed set-up, he explained, the shipper of a quantity of freight less than the carload minimum would have the privilege of tendering such a shipment as a carload, either separately or in a multiple load subject to the carload minimum weight and rate, provided there was compliance with the ODT's General Order No. 18.

"In the present emergency," he went on, "it is reasonable that if a shipment is tendered as l. c. l. and is given l. c. l. service, the railroads should be compensated for that service by the payment of l. c. l. rates. A shipper or his representative should not be permitted, after the transportation has been completed, to claim carload rates on shipments which, under the terms of General Order O. D. T. 18, revised, could not have been offered initially to the railroad as a carload."

The proceeding involving Rules 15 and 16 is docketed as I. & S. No. 5165, while that involving the Rule 33 change is I. & S. No. 5166.

Materials and Prices

Following is a digest of orders and notices of interest to railroads, issued by the War Production Board and the Office of Price Administration since November 17.

Industrial equipment—Limitation Order L-123, as amended November 24, prohibiting manufacturers from making or delivering industrial equipment without approved orders, makes an exception of orders for, or delivery of, maintenance or repair parts in an amount not exceeding $1,000 for any single piece of general industrial equipment to be repaired or maintained; or in any amount for the repair of general industrial equipment when there is an actual breakdown or suspension of operations because of damage, wear and tear destruction or failure of parts, and the essential repair or maintenance parts are not otherwise available; but requires the purchaser to furnish his supplier with a description of the repair work. Equipment covered by the order includes conveying machinery, except power and hand lift trucks, cranes, hoists and platform elevators, construction mixers, pavers, graders, drag lines and power shovels and similar construction machinery, cars and car dumpers. The list also includes mechanical power transmission equipment; mechanical drives and parts for transmitting more than ¾ h.p.; industrial fans and blowers; industrial compressors and vacuum pumps; industrial pumps, mechanically operated; industrial hand trucks, including trucks or trailers not self-power propelled; stationary steam engines, except marine engines and steam engine generator sets; passenger or freight elevators; portable platform type elevators and steel platforms; electric motors of one horse power and over; and lifting magnets, circular type, 18-in. diam. and larger.

Priorities—Booklets of detailed instructions for filling out the Bills of Materials required by the Controlled Materials Plan, which will supersede priorities in controlling critical materials, were issued November 14. Under this plan, prime consumers of aluminum, copper and steel must submit requirements for the second quarter of 1943 in the form of Bills of Materials to Claimant Agencies (Army, Navy, Maritime Commission, Civilian Supply, etc.) from which they will receive their allotments. Secondary consumers must file bills of materials with their customers who, in turn, are responsible for accuracy and who will include them in their own bills of materials submitted to the Claimant Agencies. The materials are restricted to size and grade and include carbon steel bars, pipe, plates, rails and track accessories, sheets and strip, steel castings, structural shapes and piling, tubing, wheels and axles and wire rods, wire and wire products and alloy steel bars, pipe, plates, sheets and strip, steel castings, tubing, wheels and axles and wire rods, wire and wire products.

Rail—Order L-88, issued November 24, requires scrap dealers and industrial companies to secure permission for the sale of scrap and re-rolling rail in excess of 10 tons a month. All communications concerning used rail of relayer grade should be addressed to Transportation Equipment Division, WPB, Washington, D. C., Ref. L-88. All communications concerning used rail or reroll or scrap grade should be addressed to Scrap Unit, Steel Division, WPB, Washington, D. C., Ref. L-88.

Shingles—Limitation Order L-228, effective January 1, 1943, restricts grades and types of asphalt and tarred roofing products and asphalt shingles produced to sizes and forms of finished merchandise specified in exhibit A of the order.

Zinc—Conservation Order M-11-b, amended November 26, further restricts the use of zinc in industrial materials. The amendment prohibits metals coated or plated with zinc for making items listed in the order, which include automotive Diesel engines; also down spouts, flashing, gutters, weatherstripping, signs and stationary gasoline and Diesel engines. The order restricts the manufacture of zinc-coated metals in unlisted items to 75 per cent of the amount by weight of zinc of prime western grade or more than 50 per cent of the amount by weight of zinc of any other grade, respectively, during the corresponding calendar quarter of 1941. Zinc for carburetors and fuel pumps for repair, maintenance and replacement purposes during the last half of 1942 is cut to 25 per cent of the zinc used during the third quarter of 1942, and metal during the first quarter of 1943 or subsequent quarters is cut to 50 per cent of the amount of zinc used during the third calendar quarter of 1942.

Prices

Fuel oil—Revised Maximum Price Regulation No. 236, issued and effective November 25, makes allowances for the conversion of heating boilers from oil to coal. Cost increases reflecting freight charges at the manufacturer's level will mean an average increase of $1.50 to $2 on parts necessary to convert an average oil-fired heating boiler to the use of hand-fired solid fuels. At the same time, certain new combination conversion units were priced at dollars-and-cents maximum prices installed and sales of parts weighing 10 lb. or less were excluded from the revised regulation and put under Maximum Price Regulation No. 188, which sets manufacturers' ceiling prices on specified building materials, and the General Maximum Price Regulation.

Gasoline—Amendment No. 1 to the new nation-wide gasoline rationing regulations, effective November 21, permits truck operators who have applied to the Office of Defense Transportation for, but have not received Certificates of War Necessity to apply at local war price and rationing boards for temporary transport rations to be valid beginning December 1. Applicants may receive T rations on this temporary basis for the amount of gasoline required through December 31. Any gallonage provided through a temporary ration will later be deducted from the gallonage allowed by ODT on the Certificate of War Necessity.

Indexes—The second of a series of digests of interpretations of the General Maximum Price Regulation was issued November 23. The new pamphlet brings together digests of important interpretative rulings, and supplements an earlier manual released by OPA on August 22.

GENERAL NEWS

Probe Is Resumed On Rail Seizures

Some senators suspect lines are being junked before actual need arises

Resuming this week the public-hearing sessions which had been in recess since mid-October, the Senate interstate commerce sub-committee investigating War Production Board rail-requisitioning activities inquired into reports to the effect that there is no longer any need for hurried seizures of lines because WPB already has sufficient relay rail to meet war-agency needs for the next seven or eight months.

At the resumed hearings, the sub-committee which is headed by Senator Johnson, Democrat of Colorado, with Senator Reed, Republican of Kansas, as his most active associate, first heard Andrew Stevenson, director of WPB's Transportation Equipment Division, and J. Wideman Bertch, chief of the Special Projects Section of WPB's Conservation Division. Mr. Bertch had testified at the previous hearings, reported in the *Railway Age* of October 10, page 572, and in the issue of October 17, page 619. Since that time the Office of Defense Transportation has modified procedures for its role in connection with requisitionings, providing for the issuance of a proposed report and opportunities for interested parties to express their views before certifying lines to WPB for seizure.

With respect to the amount of relay rail now on hand, Mr. Stevenson agreed with Senator Reed's suggestion that it was sufficient to lay 1,800 miles of track. At the beginning of 1942, he testified, the inventories were even larger, amounting to about 44,000,000 feet or enough to lay approximately 4,400 miles. Mr. Stevenson also told how new rail is released to railroads on a basis which requires them to return in relay rail a footage equivalent to 90 per cent of the new rail received. Actually, he said, only about 50 per cent of the second-hand rail thus turned in has been found suitable for relay purposes.

Mr. Bertch said that there is at present no actual requisitioning, and he does not expect that it will be resumed unless needs develop which are not now forseeable. However, WPB is asking ODT to continue making certifications so that there will be available a backlog of seizable lines on which prompt action may be taken if new demands do arise. Senator Reed said that he had gathered data and made personal investigations in Kansas which indicates that Army estimates of rail needed for war plants have exceeded actual requirements by about 30 per cent. The Senator's checks were made at plants which were nearly completed, and the engineers, he said, could tell within 100 feet what their rail requirements were turning out to be. The Senator compared such figures with the Army's original estimates.

Meanwhile, Senator Johnson had criticized what he called the autocratic procedure of WPB; and he and Senator Reed both contended that ODT has no real chance to determine the public need for the lines involved. Mr. Bertch replied that never since he came on the job last February had a line been requisitioned without consulting ODT.

Colored Employees More Than 7 Per Cent of Total

The New York Central as of October 1 had 9,282 colored employees—almost 7.2 per cent of its total working force on that date—compared with a colored *population* in the states the system serves which is 4.6 per cent of the total.

These colored railroaders were working in 119 different occupations—including such skilled crafts as machinist, boilermaker, car inspector and car repairer; and an even larger number were employed as helpers in various skilled crafts. Some 30 of them occupied supervisory positions. Of the total, 37 were women.

Employment Practices Hearing Set for January 25

Public hearings on complaints submitted to the President's Committee on Fair Employment Practice of the War Manpower Commission will be held in Washington January 25, 26 and 27, according to an announcement by the commission. These hearings were first announced for December 7, 8 and 9, but have been postponed to allow time for investigation by a field staff working out of a temporary office in Atlanta, Ga.

The committee has engaged Henry Epstein, solicitor general of the state of New York, to conduct the hearings, which will be devoted largely to complaints of Negro railroad employees, principally firemen, that they have been discriminated against because of their race by certain railroads, acting alone or in agreement with labor unions. It is claimed that Negro firemen are refused employment on Diesel-electric locomotives and on stoker-fired steam locomotives.

$707 Million Net Income in 10 Mos.

Net railway operating income for the same period was $1,159,921,260

Class I railroads in the first ten months of this year had an estimated net income, after interest and rentals, of $707,900,000, as compared with $413,333,947 in the corresponding period last year, according to the Bureau of Railway Economics of the Association of American Railroads. The net railway operating income for the ten months period, before interest and rentals, was $1,159,921,260 in 1942, compared with $850,021,279 in the same period in 1941.

In the 12 months ended October 31, 1942, the rate of return averaged 4.93 per cent, compared with 3.80 per cent for the same twelve month period in 1941.

For the month of October this year the estimated net income was $134,900,000, compared with $53,675,973 in October, 1941; while the net railway operating income for the same month was $184,680,008, compared with last year's $94,047,846.

Total operating revenues in the ten months amounted to $6,073,123,653, compared with $4,410,127,991 in the same period in 1941, or an increase of 37.7 per cent.

Operating expenses amounted to $3,763,-167,750, compared with $2,976,029,032, or an increase of 26.4 per cent.

Class I roads in the ten months paid $1,001,363,058 in taxes, compared with $472,047,088 in the same period in 1941. For October alone, the tax bill amounted to $127,748,998, an increase of $78,077,131 or 157.2 per cent above October, 1941. Thirteen Class I roads failed to earn interest and rentals in the ten months, of which six were in the Eastern district, one in the Southern district and six in the Western district.

Gross for October totaled $745,584,164 compared with $517,604,960, in October, 1941, while operating expenses totaled $416,430,354 compared with $361,513,715 in the same month of 1941.

Class I roads in the Eastern district in the ten months had an estimated net income of $298,600,000 compared with $230,783,-425 in the same period last year. Their ten months net railway operating income of $477,671,443, compared with $415,285,-761. Operating revenues in the Eastern district in the ten months totaled $2,833,-593,452, an increase of 29.5 per cent compared with the same period in 1941, while operating expenses totaled $1,813,301,124, an increase of 23.5 per cent.

In the Eastern district the October esti-

mated net income was $53,700,000, compared with $23,557,831 in October, 1941. Net railway operating income for the month amounted to $73,047,224, compared with $41,736,621.

Class I roads in the Southern district in the ten months had an estimated net income of $109,300,000 compared with $60,586,816 in the same period last year.

They had a net railway operating income of $166,045,770 compared with $115,750,660. The ten-month gross in the Southern district totaled $848,340,537, an increase of 48.4 per cent compared with the same period in 1941, while operating expenses totaled $505,166,777, an increase of 31.5 per cent.

In the Southern district for October the estimated net income was $14,900,000 compared with $5,378,304 in October, 1941.

for a special committee of five "to make a full and complete study and investigation with respect to the production, transportation, and use of fuels, including coal, natural gas, petroleum, fuel oil, and gasoline, in the region lying between the Mississippi River and the Rocky Mountains and between the Mexican and Canadian borders of the United States." This committee is directed to report "as soon as practicable."

Signal Section Elects

The Signal Section of the Association of American Railroads has elected the following officers for 1943: Chairman, S. W. Law, signal engineer, Northern Pacific, St. Paul, Minn.; first vice-chairman, J. P. Muller, engineer signals and telegraph, Boston & Maine, and signal engineer, Maine Central, Boston, Mass.; second vice-chairman, S. E. Noble, superintendent telegraph and signals, Chicago & North Western, Chicago. R. H. C. Balliet continues to act as secretary for the section, with headquarters at 30 Vesey street, New York.

J. J. Corcoran, signal engineer, New York Central, Cleveland, Ohio, is the retiring chairman. L. B. Porter, superintendent telegraph and signals, C. M. St. P. & P., Milwaukee, Wisc., and W. S. Storms, signal engineer, Erie, Cleveland, Ohio, have been elected to the Committee of Direction for the January 1, 1943, to December 31, 1946, term.

CLASS I RAILROADS—UNITED STATES

Month of October

	1942	1941
Total operating revenues	$745,584,164	$517,604,960
Total operating expenses	416,430,354	361,513,715
Operating ratio—per cent	55.85	69.84
Taxes	127,748,998	49,671,867
Net railway operating income (Earnings before charges)	184,680,008	94,047,846
Net income, after charges (estimated)	134,900,000	53,675,973
Ten Months Ended October 31		
Total operating revenues	$6,073,123,653	$4,410,127,991
Total operating expenses	3,763,167,750	2,976,029,032
Operating ratio—per cent	61.96	67.48
Taxes	1,001,363,058	472,047,088
Net railway operating income (Earnings before charges)	1,159,921,260	850,021,279
Net income, after charges (estimated)	707,900,000	413,333,947

Net railway operating income amounted to $21,553,234 compared with $11,301,536.

Class I roads in the Western district in the ten months had an estimated net income of $300,000,000 compared with $121,963,706 in the same period last year. Those same roads had a net railway operating income of $516,204,047 compared with $318,984,858. Gross in the Western district in the ten months totaled $2,391,189,664, an increase of 44.9 per cent compared with the same period in 1941, while operating expenses totaled $1,444,699,849, an increase of 28.5 per cent.

The Western district estimated net income of $66,300,000 for October compared with $24,739,838 in October, 1941. Net railway operating income amounted to $90,079,550 compared with $41,008,889.

Senators Want Transportation Investigated

Two resolutions introduced in the Senate November 25 and referred to the committee on interstate commerce for consideration provide for investigations by Senate committees of transportation facilities in the United States. Senate Resolution 317, offered by Senator O'Daniel, Democrat, of Texas, provides for an investigation by the interstate commerce committee, or a subcommittee thereof, of "the use of various types of transportation facilities in connection with the war effort."

Senate Resolution 319, introduced by Senator Clark, Democrat of Missouri, for himself and Senators Reed and Capper of Kansas, Republicans, Thomas of Oklahoma, Gillette of Iowa, Connally of Texas and Truman of Missouri, Democrats, provides

Roads to Provide Coordinated Train Service to Florida

The Pennsylvania, the Chicago & Eastern Illinois, and the Illinois Central have announced the inauguration of additional co-ordinated rail passenger transportation between the Middle West, Florida and intermediate territory during the winter season, effective December 17. The announcement was made with the approval of the ODT.

A daily Pullman-coach train will depart from Chicago at 9:35 a. m. with arrivals in Jacksonville, Fla., at 1:50 p. m. and Miami at 10:15 p. m. the following day. Returning, departure will be from Miami at 10 a. m. and Jacksonville at 6:30 p. m., with arrival in Chicago at 8:40 p. m. the following day. The trains to be operated in this coordinated service are the "Jacksonian" of the Pennsylvania, the "Dixieland" of the Chicago & Eastern Illinois, and the "Sunchaser" of the Illinois Central, each road operating its train every third day.

The "Seminole," the "Southland" and the "Dixie Flyer" will continue to operate on slightly revised schedules on a two-night-out basis, providing through sleeping car service to Jacksonville and the west coast of Florida. The all-coach streamliners, the "South Wind," the "Dixie Flagler" and the "City of Miami" will be operated on their present schedules.

The Louisville & Nashville, Central of Georgia, Atlantic Coast Line, N. C. & St. L., Atlanta, Birmingham & Coast, and Florida East Coast will cooperate with the three Chicago railroads in providing this seasonal service.

Heads I C. C. Inquiry Bureau

Edgar M. Ebert, assistant director of the Interstate Commerce Commission's Bureau of Inquiry, has been appointed director of the Bureau to succeed the late William H. Bonneville. Attorney Harry L. Underwood succeeds Mr. Ebert as assistant director.

Uniform System of Accounts for Freight Forwarders

The Interstate Commerce Commission, Division 1, has made public an order of November 4, prescribing a uniform system of accounts for freight forwarders, effective January 1, 1943. It will apply to forwarders having annual operating revenues exceeding $100,000.

October Earnings in Canada

The two principal Canadian railways reported October earnings and expenses as follows:

Canadian Pacific

October	1942	Increase
Gross	$22,799,232	$1,222,580
Expenses	17,081,050	1,442,286
Oper. Net	$5,718,182	-$219,706
10 Months		
Gross	$209,925,848	$29,891,702
Expenses	172,201,925	27,833,338
Oper. Net	$37,723,923	$2,058,364

Canadian National

October		
Gross	$36,002,000	$7,241,490
Expenses	27,098,612	4,376,831
Oper. Net	$8,903,388	$2,864,659
10 Months		
Gross	$306,829,000	$57,756,479
Expenses	235,164,638	40,720,172
Oper. Net	$71,664,362	$17,036,307

December Issue of "Transit Journal" to be Last

A veteran publication in the transportation field has come to the end of its career. The publishers of the "Transit Journal" have announced the termination of that publication effective with the December issue. In making the announcement, the president of the McGraw-Hill Publishing Company stated that the Journal "has been operating under increasingly difficult publishing conditions for more than ten years. These trying conditions, which have been intensified by the war, as evidenced by such actions as the 'freezing' of street car production, have reached an inoperative stage so far as the Transit Journal is concerned."

Established in 1884, the Journal origi-

nally served the operators of horse cars as the "Street Railway Journal." The name was changed to "Electric Railway Journal" when the electric street car came into being. Later, with the transition from rail to rubber in the 1920's, the publication covered the operating and manufacturing branches of all forms of rapid transit, including trolley lines and buses, and the name was changed to "Transit Journal."

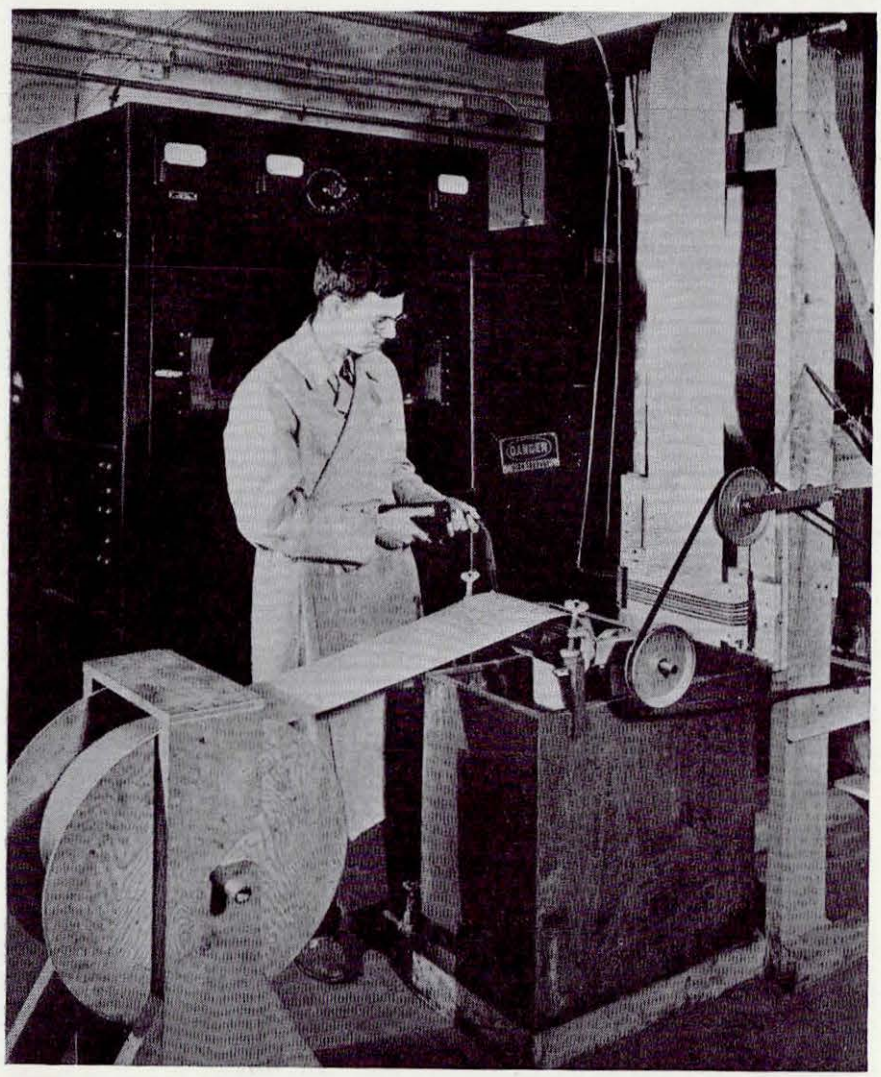
Radio Waves Save Tin

Until recently all tin plate was coated by running the sheet iron through a bath of molten tin. For light gage plate, such as is used for cans, this requires about a pound and a half of tin for each 100 lb. of iron. Within the last two or three years, electrolytic methods for depositing the tin on the iron have been developed. By this process the amount of tin applied to make a satisfactory corrosion resistance surface may be reduced to ½ lb. for each 100 lb. of iron. The tin, as deposited, is granular and porous and must be flowed by heat to make a shiny corrosion-resisting finish.

The process of plating and heating requires periodic changes in speed of the tin plate as it is moved through the machine from one roll to another. When the heat is constant, increased speeds will cause the tin to pass through the furnace without flowing, and reduced speeds may cause overheating and oxidation of the tin.

The Westinghouse Electric & Manufacturing Company has now developed a high-frequency method of heating which is adjustable to all changes in speed. The electroplated tin plate is passed through a coil of a few turns of wire carrying electric current at 200,000 cycles frequency. This induces short-circuit currents in the plate to flow the electroplated tin. A photo-electric cell controls exactly the amount of heat required regardless of the speed with which the plate is moved through the coil. The old dipping process had a maximum speed of 150 ft. per min. and the present electroplating method, with subsequent high-frequency heating, can now be operated at 500 ft. per min., and much higher speeds are possible. One-half pound of tin per 100 lb. of iron makes a satisfactory surface, and it is estimated that .7-lb. of electroplated tin subsequently flowed electrically is equal to 1½ lb. applied by the dipping process.

The illustration shows an experimental installation used on a 10-in. strip of metal. Wider strips are used in commercial processing.



A Laboratory Installation of High-Frequency Heating for the Flowing of the Electroplated Coating on Tin Plate—The 6-Turn Coil at the Right Does the Heating

Pacific Northwest Board Discusses Car Use

Effective use of freight cars and ways to accomplish it were discussed at the fifty-third regular meeting of the Pacific Northwest Advisory Board in Eugene, Ore., on December 4. Major General F. Gilbreath, U. S. Army, port commander of the San Francisco Port of Embarkation, discussed "Wartime Shipping Problems" at a banquet in the evening.

Hearing on B. & M.-Maine Central Acquisition of Air Line

Applications of the Boston & Maine and Maine Central for approval of their acquisition of control of Northeast Airlines, Inc., were the subject of public hearings before the Civil Aeronautics Board in Washington, D. C., this week. Involved also is the roads' application for a determination of the Board's jurisdiction over the transaction.

Club Meeting

The A. S. M. E., Chicago section, Transportation division, is scheduled to hold a meeting at 7:30 p. m. Monday evening, December 14, at the Civic Opera building, Chicago, to be addressed by E. Kuehn, special representative to vice-president, General Motors Corporation, Electro-Motive division, the subject of Mr. Kuehn's remarks being "The Diesel Engine in Railroad Transportation."

Air Express Poundage Up 90 Per Cent

The Air Express division of the Railway Express Agency reports an increase of 90 per cent in weight of shipments flown by air express during the first nine months of this year. During that period 15,085,345 lb. were handled, as compared with 7,927,181 lb. in 1941. Shipments for the same period numbered 1,033,761, as compared with 947,760 for the 1941 period, an increase of 9 per cent. Gross revenue was up 112 per cent.

Towage of Logs and Piling in Rafts Subject to Regulation

Modifying previous orders in the Ex Parte No. 147 proceeding involving the towage of floating objects, the Interstate Commerce Commission has now found that the transportation of piling and logs in rafts should not be exempt from regulation under the Interstate Commerce Act's Part III. The decision came following a hearing granted upon petition of water carriers operating on the Columbia river and along the northwest Pacific coast, the commission meanwhile suspending the logs-and-piling phase of the original order.

The present report finds that such transportation is not subject to exemption under section 303(e) "because (1) there is nothing in the inherent nature of logs and piling which makes the transportation by water carriers noncompetitive with the transportation of the same commodities by

common carriers subject to part I, II, or III, (2) no special equipment is required to transport logs and piling in rafts, and (3) logs and piling in rafts are not shipped in bulk within the meaning of the statute."

Ohio Valley Board to Meet December 8

The Ohio Valley Transportation Advisory Board will hold its nineteenth annual and sixty-seventh regular meeting at Cincinnati, Ohio, on December 8. O. C. Castle, associate director, Freight operations, Division of Railway Transport of the Office of Defense Transportation, will discuss general order No. 18 and W. H. Day, vice-president of the National Association of Shippers Advisory Boards, will speak at a joint luncheon with the Chamber of Commerce Forum and the Cincinnati Traffic Club.

Cost-Plus-Fixed-Fee Contractors Must Pay Freight Tax

The Finance, Accounting, Taxation and Valuation Department of the Association of American Railroads has issued a supplement to its pamphlet on the application of the tax on amounts paid for the transportation of property, calling attention to latest advices from the Bureau of Internal Revenue which indicate that an amount paid for transportation of property, to be used by a contractor in the performance of a cost-plus-fixed-fee contract with the federal government is subject to the tax.

The advice in the foregoing connection came in a letter wherein Deputy Commissioner Bliss of the Bureau said that the finding came out of a reconsideration of the earlier advices which had been to the effect that such amounts would not be subject to the tax. Thus the A. A. R. supplement deletes from the circular paragraphs which were based on the latter.

New York-Washington and New York-Philadelphia Fares

Because the collection of New York-Washington and New York-Philadelphia fares which did not end in 0 or 5 would "tend to intensify the congestion at ticket offices at Washington, New York, and Philadelphia, and put a greater burden upon conductors in the collection of cash fares," the railroad operating between those points have applied to the Interstate Commerce Commission for authority to continue fares on the ending-in-0-or-5 basis.

The request, filed by the Baltimore & Ohio, Pennsylvania, Reading, and Central of New Jersey, takes the form of a petition for modification of Ex Parte 148's rule for the disposition of fractions which becomes operative on January 20, 1943, with the expiration of the authority under which the fare increases were published initially in master tariffs with connecting-link supplements. Also sought is the necessary relief from the fourth section's aggregate-of-intermediates provision, and authority to install the new set-up as of January 1, 1943.

The petition points out that under the fractions rule, the first-class fare between Washington and New York would become $7.37, whereas the railroads would like to make it $7.36, which with the 10 per cent tax would make a total charge of $8.10. In the New York-Philadelphia situation, both coach and first-class fares are involved, since the fractions rule would make them $1.98 and $2.97, respectively. The railroads want to keep them on the present basis of $2 and $2.95, so that the tax will put the total charges on the 0-or-5 bases of $2.20 and $3.25, respectively.

Plan to Extend K. C., M. & O.

A new 240-mile railway link in Mexico to complete the Kansas City, Mexico & Oriente to the port of Topolobampo on the Gulf of Lower California, forming a connection with the Southern Pacific of Mexico in Sonora, has been planned, according to a statement by Col. Paulino Fuentes, an executive of the road, reported in the Inter-American Economic News. The project calls for extension of existing lines from the present terminus at Creel, in the state of Chihuahua, to San Pedro, in the state of Sinaloa, a distance of 160 mi. A 78-mile line, connecting San Pedro with the Port of Topolobampo, is already in service.

According to Col. Fuentes' statement, in addition to building the new line between Creel and San Pedro, extensive improvements will be made over the entire line from Chihuahua to the Gulf of California. The roadbed will be improved, bridges rebuilt, new culverts installed and a detour of about 3 miles will be made to avoid a river crossing. Heavier rails will be laid

NET INCOME OF LARGE STEAM RAILWAYS

(Switching and Terminal Companies Not Included)

Name of Railway	Net Income After Depreciation and Amortization of Defense Projects — For the Nine Months of 1942	1941	Net Income Before Depreciation and Amortization of Defense Projects — For the Nine Months of 1942	1941
Alton	$2,072,637	$97,820	$2,285,801	$304,066
Atchinson, Topeka & Santa Fe[3]	45,073,065	20,930,079	56,623,937	30,143,166
Atlantic Coast Line	13,485,028	7,505,392	17,218,308	9,290,766
Baltimore & Ohio	22,864,610	17,891,207	31,045,003	23,562,893
Boston & Maine	6,176,958	5,366,805	7,666,965	6,435,803
Central of Georgia[2]	2,181,210	893,042	3,089,085	1,544,799
Central of New Jersey[2]	2,997,760	464,924	4,074,159	1,453,618
Chesapeake & Ohio	18,639,706	26,034,582	26,858,138	32,532,937
Chicago & Eastern Illinois	1,947,709	1,171,263	2,422,752	1,635,078
Chicago & North Western[2]	5,793,915	2,588,575	11,916,627	6,235,346
Chicago, Burlington & Quincy	17,259,074	8,019,610	22,522,218	12,238,542
Chicago Great Western	1,352,375	1,301,732	1,788,984	1,726,570
Chicago, Milwaukee, St. Paul & Pacific[2]	6,302,772	5,014,346	13,873,121	9,557,137
Chicago, Rock Island & Pacific[2]	14,070,144	4,502,694	17,567,187	7,773,063
Chicago, St. Paul, Minneapolis & Omaha	226,438	* 548,211	694,159	* 147,960
Delaware & Hudson	3,521,977	3,453,800	5,089,852	4,312,316
Delaware, Lackawanna & Western	3,410,145	3,306,066	6,493,024	5,160,692
Denver & Rio Grande Western[2]	7,691,049	* 2,817,808	9,256,008	* 1,819,908
Duluth, Missabe & Iron Range	4,703,336	11,605,382	5,824,420	12,283,582
Elgin, Joliet & Eastern	1,665,849	4,487,933	3,996,133	5,443,106
Erie	10,691,642	6,280,461	15,778,943	9,075,311
Grank Trunk Western	607,799	1,797,388	1,648,526	2,672,089
Great Northern	15,143,138	12,733,086	21,529,746	16,013,512
Gulf, Mobile & Ohio	2,609,769	1,687,187	3,422,578	2,324,389
Illinois Central	7,568,409	6,062,134	13,867,708	11,065,889
Lehigh Valley	3,567,520	3,070,625	6,737,312	4,565,916
Long Island	470,151	* 420,835	2,080,704	758,581
Louisville & Nashville	10,193,990	12,937,490	15,799,219	16,329,262
Minneapolis, St. Paul & Sault Ste. Marie[2]	* 2,675,462	* 2,721,828	* 1,038,194	* 1,761,335
Missouri-Kansas-Texas	2,845,459	* 201,792	3,703,672	655,636
Missouri Pacific[2]	21,310,822	2,702,798	25,212,225	6,084,387
New York Central[4]	32,129,045	21,824,343	54,347,805	35,526,855
New York, Chicago & St. Louis	6,030,072	7,220,171	7,976,294	8,483,651
New York, New Haven & Hartford[2]	13,106,470	4,853,949	16,410,913	7,350,204
Norfolk & Western	15,143,591	22,162,787	24,502,280	27,138,359
Northern Pacific	7,968,561	4,784,882	14,989,007	7,729,427
Pennsylvania	60,311,483	40,271,823	87,148,814	61,815,749
Pere Marquette	2,153,780	2,628,196	4,448,560	4,392,288
Pittsburgh & Lake Erie	3,163,276	4,355,893	5,556,299	6,190,887
Reading	10,390,344	7,258,402	14,171,216	9,537,405
St. Louis-San Francisco[2]	6,864,550	* 519,595	9,221,312	1,735,974
St. Louis, San Francisco & Texas	680,114	90,312	680,114	90,312
St. Louis Southwestern[2]	4,274,408	2,686,070	4,814,055	3,183,989
Seaboard Air Line[1]	14,475,088	1,001,910	16,406,662	2,844,169
Southern	18,250,812	13,132,634	25,428,365	16,157,247
Southern Pacific[5]	47,587,980	27,545,610	61,052,406	33,645,563
Texas & Pacific	5,215,938	2,221,088	6,211,259	3,173,971
Union Pacific (including leased lines)	31,424,178	14,010,249	39,663,477	20,200,591
Wabash	3,766,302	2,161,124	6,202,896	3,789,422
Yazoo & Mississippi Valley	8,492,514	1,621,879	8,910,377	2,036,818

* Deficit.

[1] Report of receiver or receivers.

[2] Report of trustee or trustees.

[3] Includes Atchison, Topeka & Santa Fe Ry.; Gulf, Colorado & Santa Fe Ry., and Panhandle & Santa Fe Ry.

[4] Includes Boston & Albany, lessor to New York Central R. R.

[5] Includes Southern Pacific Company, Texas & New Orleans R. R., and leased lines. The report contains the following information: "Figures reported for Southern Pacific Transportation System exclude offsetting debits and credits for interest on funded securities and rentals for leased properties between companies included therein. Operations for 1942 of separately operated Solely Controlled Affiliated Companies (excluding results for Southern Pacific Railroad Company of Mexico), not included in income results for the System, resulted in a net income of $531,953 for the month and $891,397 for the period. These results include $195,552 for the month and $1,762,252 for the period representing interest on bonds of such companies owned by Southern Pacific Company not taken into income by S. P. Co. and therefore, not included in the 1942 income results for the System. The combined results for 1942 for Southern Pacific Transportation System and separately operated Solely Controlled Affiliated Companies (excluding S. P. RR. Co. of Mexico) amounted to a net income of $9,150,053 for the month and $50,241,629 for the period. Figures herein given exclude results of S. P. RR. Co. of Mexico for the reason that policy was adopted January 1, 1940 of making no further advances to that company, it being required to conduct its operations entirely within its own resources."

Compiled by the Bureau of Transport Economics and Statistics, Interstate Commerce Commission. Subject to revision.

SELECTED INCOME AND BALANCE-SHEET ITEMS OF CLASS I STEAM RAILWAYS

Compiled from 132 Reports (Form IBS) Representing 136 Steam Railways
(Switching and Terminal Companies Not Included)

All Class I Railways

Income Items	For the month of September 1942	For the month of September 1941	For the nine months of 1942	For the nine months of 1941
1. Net railway operating income	$154,631,722	$104,358,837	$972,989,638	$755,974,232
2. Other income	11,888,353	12,331,944	111,900,616	111,283,885
3. Total income	166,520,075	116,690,781	1,084,890,254	867,258,117
4. Miscellaneous deductions from income	4,412,342	2,290,248	24,177,058	20,949,034
5. Income available for fixed charges	162,107,733	114,400,533	1,060,713,196	846,309,083
6. Fixed charges:				
6-01. Rent for leased roads and equipment	17,598,338	13,801,304	134,816,618	120,065,073
6-02. Interest deductions[1]	36,894,311	39,164,616	332,636,036	348,112,378
6-03. Other deductions	119,113	120,478	1,060,684	1,070,780
6-04. Total fixed charges	54,611,762	53,086,398	468,513,338	469,248,231
7. Income after fixed charges	107,495,971	61,314,135	592,199,858	377,060,852
8. Contingent charges	2,305,848	1,547,288	20,227,867	13,892,577
9. Net income	105,190,123	59,766,847	571,971,991	363,168,275
10. Depreciation (Way and structures and Equipment)	22,888,749	18,259,084	184,010,945	161,911,924
11. Amortization of defense projects	8,356,188	219,626	57,073,185	274,805
12. Federal income taxes	88,659,752	28,421,340	551,777,651	145,235,551
13. Dividend appropriations:				
13-01. On common stock	8,275,899	6,189,195	78,554,055	81,185,964
13-02. On preferred stock	1,064,204	75,000	19,398,665	17,666,843
Ratio of income to fixed charges (Item 5 ÷ 6-04)	2.97	2.15	2.26	1.80

Selected Asset and Liability Items	Balance at end of September 1942	Balance at end of September 1941
20. Investments in stocks, bonds, etc., other than those of affiliated companies (Total, Account 707)	$508,661,918	$552,330,565
21. Cash	991,788,447	813,678,477
22. Temporary cash investments	443,671,304	154,441,814
23. Special deposits	147,889,534	223,666,788
24. Loans and bills receivable	998,003	1,234,133
25. Traffic and car-service balances—Dr.	40,935,933	32,955,712
26. Net balance receivable from agents and conductors	141,684,254	79,774,944
27. Miscellaneous accounts receivable	385,064,283	165,369,033
28. Materials and supplies	522,560,019	411,976,308
29. Interest and dividends receivable	21,744,450	20,951,217
30. Rents receivable	1,261,223	1,427,298
31. Other current assets	13,619,410	10,130,934
32. Total current assets (items 21 to 31)	2,711,216,860	1,915,606,658
40. Funded debt maturing within 6 months[2]	103,291,207	125,491,971
41. Loans and bills payable[3]	32,289,499	71,214,355
42. Traffic and car-service balances—Cr.	105,402,345	59,488,619
43. Audited accounts and wages payable	318,302,370	267,464,047
44. Miscellaneous accounts payable	68,531,644	47,991,471
45. Interest matured unpaid	53,777,164	44,902,607
46. Dividends matured unpaid	13,647,535	14,661,939
47. Unmatured interest accrued	76,561,025	76,173,799
48. Unmatured dividends declared	9,756,703	5,123,955
49. Unmatured rents accrued	21,995,647	22,095,770
50. Accrued tax liability	838,614,063	367,022,393
51. Other current liabilities	59,799,382	48,991,469
52. Total current liabilities (items 41 to 51)	1,598,677,377	1,025,130,424
53. Analysis of accrued tax liability:		
53-01. U. S. Government taxes	688,686,671	223,722,004
53-02. Other than U. S. Government taxes	149,927,392	143,300,389

[1] Represents accruals, including the amount in default.
[2] Includes payment of principal of long-term debt (other than long-term debt in default) which will become due within six months after close of month of report.
[3] Includes obligations which mature not more than 2 years after date of issue.

and 200,000 old ties will be replaced. New shops and a roundhouse will be built at Los Mochis, near the Pacific coast. Water facilities and new stations will be erected at many places along the line. Housing accommodations for permanent employees will also be enlarged and improved.

The line from Fuentes Brotantes to Penasco, in the state of Sonora, is reported to be in good condition. This line is 147 mi. long and plans are reported under way to extend it another 43 mi. beyond the port of Penasco.

ODT Extends Restrictions Over Drive-Yourself Cars

General Order ODT No. 26, effective December 1, "freezes" the number of motor vehicles used as "rental cars," an Office of Defense Transportation announcement states. Included in this classification are about 30,000 livery cars and some 5,000 drive-yourself cars, many of which in normal times were available to railroad travelers for local use through arrangements between railroads and the operators. The order requires that records be kept covering daily operations of each such vehicle, including the purpose for which it was used, and provides that no increase shall be made in the number of automobiles engaged in such service. The announcement indicates that ODT regulations covering the operation of rental cars are now in preparation.

O. R. C. and B. of R. T. Jurisdictional Dispute on P. R. R.

The Order of Railway Conductors has filed in the United States District Court for the District of Columbia a complaint alleging that the Brotherhood of Railroad Trainmen and the Pennsylvania have violated the Railway Labor Act by entering a "private and secret" agreement whereby the B. of R. T. would be recognized as the representative of "assistant conductors."

The O. R. C. objects to what it calls an attempt to "carve out of the road conductors' work a purported new class or craft of 'assistant conductors.'" It seeks an injunction restraining the B. of R. T. from bargaining for P. R. R. conductors, so long as O. R. C. is authorized to do so. In the latter connection there is now pending before the National Mediation Board a proceeding wherein the Trainmen, challenging the Conductors' authority to represent P. R. R. road conductors, have asked for an election and N. M. B. certification on the matter.

Terminal Tells Public What Its Wartime Day's Work Is

Through a full page advertisement in a local newspaper the Washington, D. C., Terminal, in co-operation with railroads serving the city, on December 1 explained in words and pictures how it has handled a great expansion in business brought about by wartime conditions. To begin with, the advertisement points out, the station facilities were planned in 1901 on a scale adequate for fifty years growth. Consequently, it says, the 30 train gates and the concourse have been ample to accommodate the average of 110,000 passengers who now use the station daily, a figure that rises to 130,000 on Saturdays and Sundays. Where 15 ticket windows were adequate in peace times 65 are now in use. An average of 2,300 parcels are checked daily, and there are 1,304 individual parcel lockers in use. Terminal operations require some 4,500 employees, the advertisement states, including 500 in roundhouse and shop work. In October a total of 108,196 locomotives and cars were handled in the terminal.

Newly Elected Officers of New York Railroad Club

At the November meeting of the New York Railroad Club the following officers were elected: President, C. C. Hubbell, general purchasing agent, Delaware, Lackawanna & Western, New York; first vice-president, A. E. Calkins, assistant to general superintendent motive power and rolling stock, New York Central, New York; second vice-president, E. A. Jones, purchasing agent, Lehigh Valley, New York; third vice-president, F. S. Austin, purchasing agent, New York Central, New York; treasurer (re-elected), D. W. Pye, president of the Tuco Products Corp., New York.

Roy V. Wright, managing editor of *Railway Age,* was re-elected a member of the executive committee and William White, president of the Delaware, Lackawanna & Western, was elected a member of the executive committee to fill the unexpired term of F. S. Austin. Arthur N. Dugan, vice-president of the National Bearing Metals Corp., was re-elected a member of the finance committee.

October Locomotive Shipments

October shipments of railroad locomotives totaled 177, the same number as in September this year. In October, 1941, the total was 102. These figures are contained in reports based on statements of builders to the Bureau of the Census of the Department of Commerce. Shipments in the first ten months of this year totaled 1,332 locomotives, including 571 steam, 12 electrics, 680 Diesel-electrics, and 69 of other types,

as compared with 145 steam, 17 electrics, 577 Diesel-electrics, and 46 of other types during the same ten months of 1941.

Unfilled orders reported by builders as of October 31, 1942, totaled 1,839 locomotives, including 979 steam, 48 electric, 799 Diesel-electric, and 13 of other types. Comparable figures for the same date in 1941 were: Total, 921; steam, 268; electric, 49; Diesel-electric, 550; other types, 54.

Data furnished by the Car Service Division of the Association of American Railroads indicate that five locomotives were built in railroad shops during October, 1942, of which four were steam and one electric. In October, 1941, two locomotives, both steam, were built in railroad shops. During the first ten months of this year railroad shops built 63 locomotives, of which 46 were steam and 17 electric, as compared with 14—including 12 steam and 2 electric—in the same period of 1941. As of November 1, this year, railroad shops had unfilled orders for 87 locomotives, including 73 steam and 14 electric.

Pennsylvania Conservation

As a result of the conservation program initiated early in 1940, the Pennsylvania has entirely eliminated its use of aluminum, releasing for war use in 1942 approximately 100,000 lb., based on last year's consumption. The consumption of tin, totaling 726,405 lb. in 1941, has been reduced from an average of over 60,500 lb. a month to less than 14,000 lb.—a saving of more than 75 per cent—and the use of rubber is being rigidly conserved by newly developed methods.

Substitute materials have been devised to make scores of items and designs and specifications are being changed to permit the use of non-alloy steels, where safety is not affected, while in many instances it has been found possible to fabricate from sheet steel parts which were formerly cast in foundries. Rebuilding worn parts by welding new metal to them, or by reforging, is saving a large tonnage of new steel which would otherwise be needed for replacements. Damaged electric cables go back into service in shorter lengths; used files are sharpened; and scrap locomotive and car axles are used in making billets and bars from which many steel parts are made. Recoverable portions of steel sides and floors removed from hopper and gondola cars are salvaged and used to make gusset plates, brackets, miscellaneous strips and connections; while other serviceable parts of the original sheets are welded together so they can be used again in car repairs and save new steel. Much steel is being saved by salvaging worn rails for further service, battered ends being cut off or rebuilt by welding.

Numerous expedients are helping to meet the rubber shortage. Serviceable sections of worn air brake hose, used between cars, are spliced together to make standard lengths. Rubber gaskets, used in air brake valves, are boiled in water to restore their original shape; and it has been possible to maintain the air brake equipment of the entire railroad without purchasing any new gaskets for this purpose during the last six months. All employees engaged in the care and operation of the railroad's rubber tired vehicles are thoroughly instructed in the conservation practices recommended by leading tire company engineers.

In the case of tin, savings are being made by eliminating the use of certain types of bearing alloys and substituting lining material using no tin. The tin content of solder has been substantially reduced. Tracks in yards where car repairs are made have been thoroughly cleaned to reclaim cuttings and other small pieces of metal. Scarce copper is being replaced by cast iron in numerous passenger car parts, from window curtain fittings to floor plate castings. Nuts are carefully removed from bolts with wrenches, instead of being burned off, as in peacetime. Thousands of gallons of fuel oil are being saved and even cork and shellac, although used in relatively small quantities on the railroad, are being scrupulously conserved.

The conservation program is not intended to save money for the railroad or to produce more durable or otherwise superior results, but to avoid, as far as possible, the use of critical war materials. The railroad considers this to be part of its contribution to the nation's war effort.

Name Liberty Ship for Daniel Willard

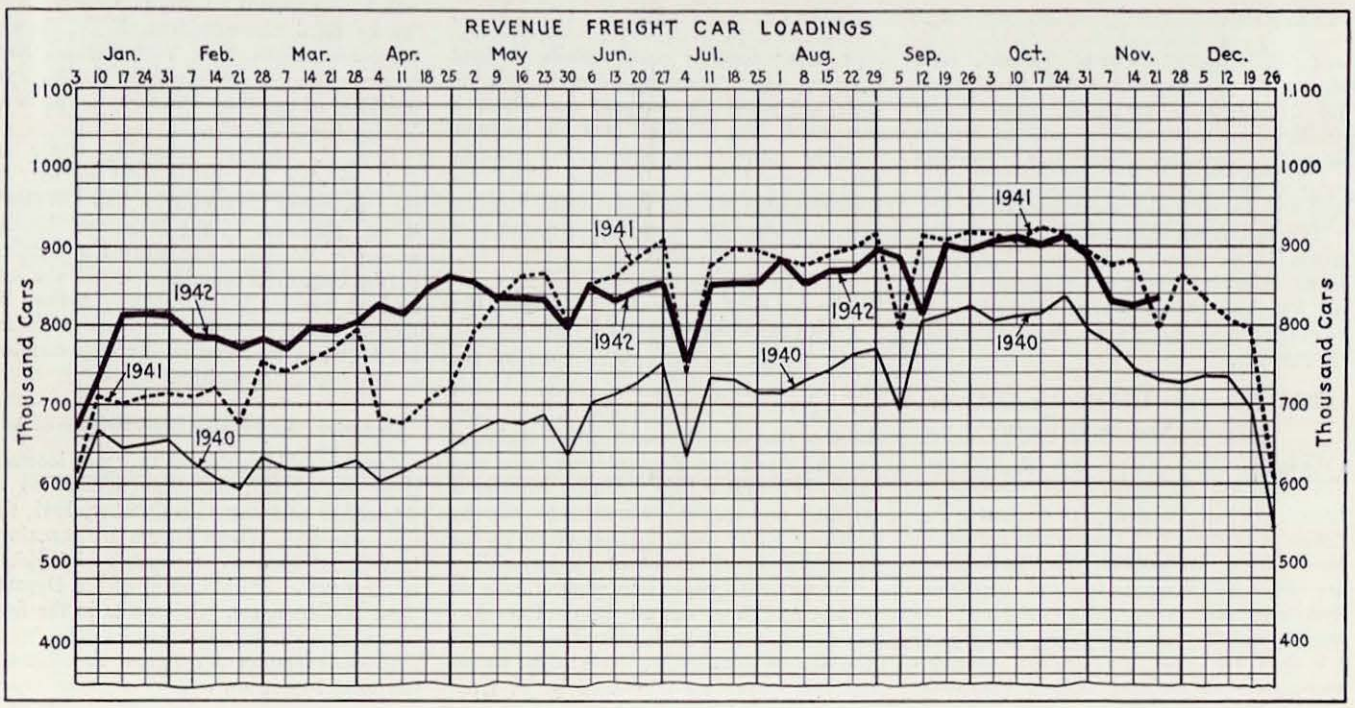
The seventy-fifth Liberty ship launched at the Bethlehem-Fairfield shipyard in Baltimore, Md., was named for Daniel Willard, late president of the Baltimore & Ohio. The sponsor for the "Daniel Willard" was 14-year-old Mary Beale Willard, Mr. Willard's granddaughter.

The B. & O. actually had a part in the building of this 10,500-ton cargo vessel. Not only does the road haul dozens of carloads of ship parts daily from the prefabricating shop to the building ways, but it also has a subcontract whereby rough castings of parts which go into the triple-expansion marine engines used to propel these Liberty ships are machined at its Baltimore shops.

Freight Car Loading

Loadings of revenue freight for the week ended November 28, which included the Thanksgiving holiday, totaled 743,533 cars, the Association of American Railroads announced on December 3. This was a decrease of 92,894 cars, or 11.1 per cent, below the preceding week, a decrease of 122,647 cars, or 14.2 per cent, below the corresponding week last year, but an increase of 15,008 cars over the comparable 1940 week.

Loading of revenue freight for the week ended November 21 totaled 836,427 cars



and the summary for that week, as compiled by the Car Service Division, A. A. R., follows:

Revenue Freight Car Loadings

For Week Ended Saturday, November 21

District	1942	1941	1940
Eastern	152,099	159,879	152,349
Allegheny	175,548	172,767	157,385
Pocahontas	54,026	39,998	46,386
Southern	125,370	119,779	107,192
Northwestern ..	120,309	119,734	103,612
Central Western	130,648	125,217	112,129
Southwestern ..	78,427	62,012	54,435
Total Western Districts	329,384	306,963	270,176
Total All Roads	836,427	799,386	733,488
Commodities			
Grain and grain products	45,690	41,022	33,323
Live stock.....	19,707	13,201	15,819
Coal	167,404	130,208	141,958
Coke	14,487	11,673	12,199
Forest products	42,233	39,725	39,083
Ore	58,376	55,027	40,285
Merchandise l.c.l.	91,541	141,257	140,219
Miscellaneous .	396,989	367,273	310,602
November 21...	836,427	799,386	733,488
November 14...	826,601	883,890	745,295
November 7...	829,490	873,582	778,318
October 31.....	890,469	894,745	794,797
October 24.....	903,246	913,605	837,657
Cumulative Total 47 Weeks....	39,240,743	38,377,614	32,911,414

In Canada.—Carloadings for the week ended November 21 totaled 70,260 as compared with 68,952 for the previous week and 67,053 for the corresponding week last year, according to the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
November 21, 1942.....	70.260	34,367
November 14, 1942.....	68,952	32,567
November 7, 1942.....	68,974	35,029
November 22, 1941.....	67,053	31,359
Cumulative Totals for Canada:		
November 21, 1942.....	3,056,428	1,590,969
November 22, 1941.....	2,884,041	1,403,110
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Telegraph Merger Bill

The House committee on interstate and foreign commerce has reported its version of the Senate-approved bill (S.2598) which would amend the Communications Act of 1934 to permit consolidations and mergers of domestic telegraph carriers. The House committee's version takes the form of an amendment which strikes out the Senate bill and inserts a complete substitute.

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The bus lines had previously remained ahead in the passengers-carried category for each month since they first passed the coaches last February. Meanwhile, however, the coach revenues and passenger-miles have each month been substantially in excess of comparable figures for the bus lines. August coach revenues totaled $58,555,013, an increase of 98.9 per cent above August, 1941, while the bus revenues for that month were $29,788,150, an increase of 70.6 per cent. The breakdown by regions of the August bus revenue and traffic figures, which exclude data on charter or special party service, is given in the accompanying table.

	Passenger revenue		Passengers carried	
	August, 1942	August, 1941	August, 1942	August, 1941
New England Region	$1,696,380	$920,282	3,652,828	1,720,604
Middle Atlantic Region	3,703,363	2,419,795	5,717,263	3,488,888
Central Region	4,393,045	3,121,945	5,951,359	3,714,035
Southern Region	7,627,947	4,190,381	9,451,607	5,123,516
Northwestern Region	882,836	641,854	626,056	434,421
Mid Western Region	2,667,354	1,511,336	1,828,983	930,126
Southwestern Region	4,528,365	2,149,603	5,298,064	2,210,875
Rocky Mountain Region	390,472	226,643	218,365	130,874
Pacific Region	3,898,388	2,279,571	4,221,971	2,544,826

New Haven's New "Box Lunch Bar" Pleases the Public

To relieve the strain on its dining car facilities and for the convenience of customers on its Shore line trains, the New Haven has inaugurated at its Grand Central station, New York, a new box lunch service bar. At this bar, which is in the form of an attractive blue and white wagon which may be wheeled readily from platform to platform, box lunches may be quickly purchased by passengers before boarding their trains. The service was first introduced in New York on Sunday, November 29, to serve homeward-bound Thanksgiving travelers.

A similar "bar" has been installed at the road's South station in Boston to serve passengers bound for New York and Washington. It is planned to provide this service during "peak travel" periods for those who do not have time to dine before boarding their trains and who do not wish to take their chances in a crowded diner or grill car.

The box lunches consist of one chopped ham sandwich, one chicken salad sandwich, a bottle of plain or chocolate milk and an apple. The contents may vary, however, from day to day in observance of dietary requirements.

It is reported that the reception accorded the "box lunch bar" on its first day of operation far exceeded expectations. Although the service was designed to relieve demands on dining cars during excessive holiday travel, if the innovation continues to meet with the success shown on the first two days of operation, it is likely that the road will continue the service beyond that point.

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The Interstate Commerce Commission, Division 4, has conditionally approved the purchase by the Santa Fe Trail Transportation Company, affiliate of the Atchison, Topeka & Santa Fe, of Rio Grande Truck Lines' operating rights and property covering 860 miles of highway freight lines, including a 737-mile route between Denver, Colo., and El Paso, Tex. The decision is in No. MC-F-1892.

The conditions stipulate that the operat-

The New Haven's "Box Lunch Bar" at Grand Central Terminal, New York, with the Three Attractive Attendants

Association.—J. McC. Price, Allen-Bradley Company, 624 W. Adams St., Chicago, Ill.

Railway Fuel and Traveling Engineers' Association.—T. Duff Smith, Room 811, Utilities Bldg., 327 S. La Salle St., Chicago, Ill.

Railway Supply Manufacturers' Association.—J. D. Conway, 308 Keenan Bldg., Pittsburgh, Pa.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, Waterbury Battery Company, 30 Church St., New York, N. Y. Meets with Telegraph and Telephone Section of A. A. R.

Railway Tie Association.—Roy M. Edmonds, 507 Shell Bldg., St. Louis, Mo.

Roadmasters' and Maintenance of Way Association.—Miss Lorene Kindred, Room 822, 310 S. Michigan Ave., Chicago, Ill. Annual meeting, September 21-23, 1943, Hotel Sherman, Chicago, Ill.

Signal Appliance Association.—G. A. Nelson, Waterbury Battery Company, 30 Church St., New York, N. Y. Meets with A. A. R. Signal Section.

Southern and Southwestern Railway Club.—A. T. Miller, 4 Hunter St., S. E., Atlanta, Ga. Regular meetings, third Thursday in January, March, May, July, September and November, Ansley Hotel, Atlanta, Ga.

Southern Association of Car Service Officers.—D. W. Brantley, C. of Ga. Ry., Savannah, Ga.

Toronto Railway Club.—D. M. George, P. O. Box 8, Terminal "A," Toronto, Ont. Regular meetings, fourth Monday of each month, except June, July and August, Royal York Hotel, Toronto, Ont.

Track Supply Association.—Lewis Thomas, O. and C. Company, 59 E. Van Buren St., Chicago, Ill.

United Associations of Railroad Veterans.—Roy E. Collins, 112 Hatfield Place, Port Richmond, Staten Island, N. Y. Annual meeting, October, 1943.

Western Railway Club.—E. E. Thulin (Executive Secretary), 122 S. Michigan Ave., Chicago, Ill. Regular meetings, third Monday of each month, except January, June, July, August and September, Hotel Sherman, Chicago, Ill.

Equipment and Supplies

LOCOMOTIVES

The Central of Georgia is endeavoring to purchase eight steam freight locomotives of 4-8-4 wheel arrangement.

The Nashville, Chattanooga & St. Louis is considering the purchase of 7 or 10 steam freight locomotives of 4-8-4 wheel arrangement.

The Atchison, Topeka & Santa Fe has ordered, subject to approval by the War Production Board, 20 freight locomotives of 4-8-4 wheel arrangement from the Baldwin Locomotive Works.

The Chicago, Milwaukee, St. Paul & Pacific has ordered two 1,000-hp. Diesel-electric locomotives for road and switching service from the American Locomotive Company.

The Western Pacific has placed an order, subject to approval by the War Production Board, for eight Diesel-electric switching locomotives of 1,000 hp. with the American Locomotive Company.

The Lehigh Valley has ordered, subject to the approval of the War Production Board, five 1,000-hp. Diesel-electric switching locomotives from the American Locomotive Company.

The New York, Susquehanna & Western ordered, subject to the approval of the War Production Board, two 1,000-hp. Diesel-electric locomotives for road and switching service from the American Locomotive Company.

The Richmond, Fredericksburg & Potomac has ordered two Diesel-electric switching locomotives of 1,000 hp. from the American Locomotive Company. Authority to build these locomotives has been received from the War Production Board.

The Nevada Consolidated Copper Corporation has ordered one 1,000-hp. Diesel-electric switching locomotive from the Baldwin Locomotive Works. Authorization for this locomotive has been received from the War Production Board and delivery is expected this month.

FREIGHT CARS

The Denver & Rio Grande Western is inquiring for 200 flat cars of 70 tons' capacity.

The Akron, Canton & Youngstown, Northern Ohio, has ordered 50 40-ft. 4-in. steel-frame box cars of 40 tons' capacity for immediate delivery from the Mather Stock Car Company. Authority to build this equipment has been received from the War Production Board.

The Union Pacific has ordered 1,000 41-ft. 50-ton steel-frame gondola cars of composite wood and steel construction from the Pullman-Standard Car Manufacturing Company. Deliveries are expected to begin in 1943. Authority for the building of these cars has been received from the War Production Board.

The Monongahela Connecting has placed orders for 65 38-ft. all-steel gondola cars of 120 tons' capacity for delivery in April, 1943, and for 20 43-ft. all-steel hopper cars of 100 tons' capacity for delivery in May, 1943, with the railroad's own shops. The railroad has received authority to build these freight cars from the War Production Board.

The Norfolk & Western has ordered, subject to the approval of the War Production Board, 100 52-ft. 6-in. 70-ton gondola cars of composite wood and steel construction from the Pressed Steel Car Company, and 25 53-ft. 6-in. 70-ton flat cars of composite wood and steel construction from the Greenville Steel Car Company. The inquiry for this equipment was reported in the *Railway Age* of September 19.

The Colombian National Railways, Colombia, South America, is inquiring for 75 55,100-lb. capacity box cars.

Supply Trade

Fred C. Davern has been appointed manager of railroad sales for the **Standard Oil Company of New Jersey.**

The Army-Navy "E" was awarded to the **Edwards Company,** a division of the Rogers Diesel & Aircraft Corporation of New York on November 30, at Sanford, N. C.

Damon deB. Wack, assistant to the president of the **National Bearing Metals Corporation,** has been elected executive vice-president of that company in active charge of all plants. Until his appointment as assistant to the president of the National Bearing Metals Corporation about a year ago, Mr. Wack was vice-president of the Pacific coast division of the parent corporation, the American Brake Shoe & Foundry Co.

Cecil W. Guyatt, formerly assistant chief industrial engineer, has been named chief industrial engineer of the **American Steel & Wire Co. John S. Conant** has been made priorities administrator, at the same time continuing as general supervisor of production planning, and **Lloyd W. Hackley,** formerly supervisor of production planning in the cold rolled department at the Cuyahoga works in Cleveland, Ohio, has been appointed assistant general supervisor of production planning for the entire company.

Wilson H. Moriarty, assistant to the first vice-president of the **National Malleable & Steel Castings Co.,** has been promoted to the position of assistant to the president, and **Walton L. Woody,** plant

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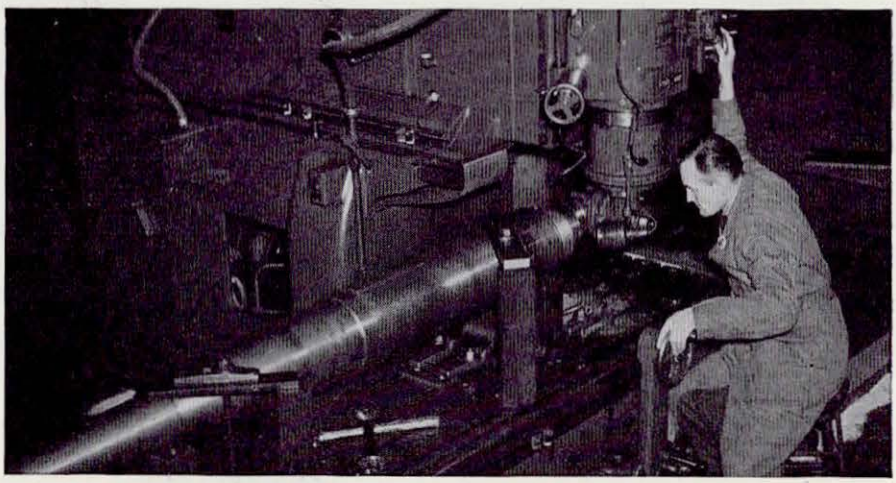

C.N.R. Munitions Plant Puts Finishing Touches on Naval Guns

News Department continued on next left-hand page

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ing rights involved must be modified to eliminate all rights to serve Gladstone, N. M., and Farley, and any point in Colorado which is not a station on the Santa Fe if such point is more than 10 miles by highway from such a station. Also, there is the usual requirement that the increase in Trail's "other intangible property" resulting from the transaction shall be amortized within five years.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

ALLIED RAILWAY SUPPLY ASSOCIATION.—J. F. Gettrust, P. O. Box 5522, Chicago, Ill.

AMERICAN ASSOCIATION OF FREIGHT TRAFFIC OFFICERS.—W. R. Curtis, G. M. & O. R. R., 105 W. Adams St., Chicago, Ill.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. P. Soebbing, Railway Exchange Bldg., St. Louis, Mo.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—B. D. Branch, C. R. R. of N. J., 143 Liberty St., New York, N. Y.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—F. O. Whiteman, Room 332, Dearborn Station, Chicago, Ill. Annual meeting, May 18-20, 1943, La Salle Hotel, Chicago, Ill.

AMERICAN ASSOCIATION OF RAILWAY ADVERTISING AGENTS.—E. A. Abbott, Poole Bros., Inc., 85 W. Harrison St., Chicago, Ill.

AMERICAN ASSOCIATION OF SUPERINTENDENTS OF DINING CARS.—F. R. Borger, C. I & L. Ry., 836 S. Federal St., Chicago, Ill.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—Miss Lorene Kindred, Room 822, 310 South Michigan Avenue, Chicago, Ill. Annual meeting, October 19-21, 1943, Chicago, Ill.

AMERICAN RAILWAY CAR INSTITUTE.—W. C. Tabbert, 19 Rector St., New York.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—H. C. Millman, Ind. Agent, Pennsylvania R. R., Union Station, Chicago, Ill.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—Works in cooperation with the Association of American Railroads, Engineering Division.—W. S. Lacher, 59 E. Van Buren St., Chicago, Ill. Annual meeting, March 16-18, 1943, Palmer House, Chicago, Ill.

AMERICAN RAILWAY MAGAZINE EDITORS' ASSOCIATION.—Page N. Price, Norfolk & Western Magazine, Roanoke, Va.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—J. H. Huntt, Tower Bldg., Washington, D. C.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—C. E. Davies, 29 W. 39th St., New York, N. Y.

Railroad Division—E. L. Woodward, *Railway Mechanical Engineer*, 105 West Adams St., Chicago, Ill.

AMERICAN TRANSIT ASSOCIATION.—Guy C. Hecker, 292 Madison Ave., New York, N .Y.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—H. L. Dawson, 1427 Eye St. N. W., Washington, D. C. Annual meeting, April 27-29, 1943, Netherland-Plaza Hotel, Cincinnati, O.

ASSOCIATION OF AMERICAN RAILROADS.—H. J. Forster, Transportation Building, Washington, D. C.

Operations and Maintenance Department.—Charles H. Buford, Vice-President, Transportation Bldg., Washington, D. C.

Operating-Transportation Division.—L. R. Knott, 59 E. Van Buren St., Chicago, Ill.

Operating Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.

Transportation Section.—L. R. Knott, 59 E. Van Buren St., Chicago, Ill.

Fire Protection and Insurance Section.—W. F. Steffens, New York Central, Room 3317, 230 Park Avenue, New York, N. Y.

Freight Station Section.—L. R. Knott, 59 E. Van Buren St., Chicago, Ill.

Medical and Surgical Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.

Protective Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.

Safety Section—J. C. Caviston, 30 Vesey St., New York, N. Y.

Telegraph and Telephone Section.—W. A. Fairbanks, 30 Vesey St., New York, N. Y.

Engineering Division.—W. S. Lacher, 59 E. Van Buren St., Chicago, Ill. Annual meeting, March 16-18, 1943, Palmer House, Chicago, Ill.

Construction and Maintenance Section.—W. S. Lacher, 59 E. Van Buren St., Chicago, Ill. Annual meeting, March 16-18, 1943, Palmer House, Chicago, Ill.

Electrical Section.—W. S. Lacher, 59 E. Van Buren St., Chicago, Ill.

Signal Section.—R. H. C. Balliet, 30 Vesey St., New York, N. Y.

Mechanical Division.—Arthur C. Browning, 59 E. Van Buren St., Chicago, Ill.

Electrical Section.—J. A. Andreucetti, 59 E. Van Buren St., Chicago, Ill.

Purchases and Stores Division.—W. J. Farrell (Executive Vice-Chairman), Transportation Building, Washington, D. C.

Freight Claim Division.—Lewis Pilcher, 59 E. Van Buren St., Chicago, Ill.

Motor Transport Division.—George M. Campbell, Transportation Bldg., Washington, D. C.

Car-Service Division.—E. W. Coughlin, (Assistant to Chairman), Transportation Building, Washington, D. C.

Finance, Accounting, Taxation and Valuation Department.—E. H. Bunnell, Vice-President, Transportation Building, Washington, D. C.

Accounting Division.—E. R. Ford, Transportation Building, Washington, D. C.

Treasury Division.—E. R. Ford, Transportation Building, Washington, D. C.

Traffic Department.—A. F. Cleveland, Vice-President, Transportation Building, Washington, D. C.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—F. L. Johnson, Claim Agent, Alton R. R., 340 W. Harrison St., Chicago, Ill.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—P. R. Austin, Johns-Manville Sales Corp., Merchandise Mart, Chicago, Ill.

CANADIAN RAILWAY CLUB.—C. R. Crook, 4415 Marcil Ave., N. D. G., Montreal, Que. Regular meetings, second Monday of each month, except June, July and August, Windsor Hotel, Montreal, Que.

CAR DEPARTMENT ASSOCIATION OF ST. LOUIS, MO.—J. J. Sheehan, 1101 Missouri Pacific Bldg., St. Louis, Mo. Regular meetings, third Tuesday of each month except June, July and August, Hotel De Soto, St. Louis, Mo.

CAR DEPARTMENT OFFICERS' ASSOCIATION.—Frank Kartheiser, Asst. to Vice-Pres., C. B. & Q., Chicago, Ill.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—G. K. Oliver, 8238 S. Campbell Ave., Chicago, Ill. Regular meetings, second Monday of each month, except June, July and August, La Salle Hotel, Chicago, Ill.

CENTRAL RAILWAY CLUB OF BUFFALO.—Mrs. M. D. Reed, 1840-42 Hotel Statler, McKinley Square, Buffalo, N. Y. Regular meetings, second Thursday of each month except June, July and August, Hotel Statler, Buffalo, N. Y.

EASTERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. T. Bougher, 424 W. 33rd St. (11th floor), New York, N. Y.

EASTERN CAR FOREMAN'S ASSOCIATION.—W. P. Dizard, 30 Church St., New York, N. Y. Regular meetings, second Friday of January, March, April, May, October and November, 29 W. 39th St., New York, N. Y.

LOCOMOTIVE MAINTENANCE OFFICERS' ASSOCIATION.—C. M. Lipscomb, 1721 Parker Street, No. Little Rock, Ark.

MASTER BOILER MAKERS' ASSOCIATION.—A. F. Stiglmeier, 29 Parkwood St., Albany, N. Y.

NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS.—Ben Smart, 7413 New Post Office Bldg., Washington, D. C. Annual meeting, September, 1943, Chicago, Ill.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. H. White, Room 1826, 208 S. La Salle St., Chicago, Ill.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, second Tuesday of each month, except June, July, August and September, Hotel Touraine, Boston, Mass.

NEW YORK RAILROAD CLUB.—D. W. Pye, 30 Church St., New York, N. Y. Regular meetings, third Thursday of each month, except June, July, August, September, and December, 29 W. 39th St., New York, N. Y. Annual dinner, December 10, 1942, Hotel Commodore, New York, N. Y.

PACIFIC RAILWAY CLUB.—William S. Wollner, P. O. Box A, Sausalito, Ca. Regular meetings, second Thursday of each alternate month, at Palace Hotel, San Francisco, Cal., and Hotel Hayward, Los Angeles, Cal.

RAILWAY BUSINESS ASSOCIATION.—P. H. Middleton, First National Bank Bldg., Chicago, Ill.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 308 Keenan Bldg., Pittsburgh, Pa. Regular meetings, fourth Thursday of each month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY ELECTRIC SUPPLY MANUFACTURERS'

* * *

Housewife Drives New Haven Locomotive

Because she failed to tell the "truth" on a recent broadcast of "Truth and Consequences," an NBC radio feature, Mrs. Erica Davies, a farm housewife of Congers, N. Y., was "required" to drive one of the New Haven's giant locomotives in the road's Cedar Hill Yard, near New Haven, Conn. The engine used was one in the yard at the time for a check-up and Engineer Billy Shove supervised the operation.

News Department continued on next left-hand page

STEAM POWER IS STILL SUPREME

Detroit to Algiers

Detroit, symbol of America's productive might, supplied many of the "most modern weapons of war" which brought speedy victory to the Allies in the battle of North Africa. And now as America and its allies swing into the offensive, Detroit and its sister cities will produce these war weapons in even greater quantities.

Since production without transportation is impossible, the American Railroads are playing an essential part in Detroit's mighty war effort. Raw materials by the thousands of tons must be shipped into Detroit and its finished products delivered to our seaports. In this vital role of transportation, The Detroit, Toledo and Ironton Railroad is serving Detroit and its surrounding territory with modern Lima-built steam locomotives. Illustrated above is one of the Lima locomotives of the 2-8-4 type providing the transportation that has helped to make America's "Motor City" the Arsenal of Democracy.

As a prime mover steam power is still supreme.

LIMA LOCOMOTIVE WORKS

LIMA LOCOMOTIVE WORKS INCORPORATED

INCORPORATED, LIMA, OHIO

Association.—J. McC. Price, Allen-Bradley Company, 624 W. Adams St., Chicago, Ill.

Railway Fuel and Traveling Engineers' Association.—T. Duff Smith, Room 811, Utilities Bldg., 327 S. La Salle St., Chicago, Ill.

Railway Supply Manufacturers' Association.—J. D. Conway, 308 Keenan Bldg., Pittsburgh, Pa.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, Waterbury Battery Company, 30 Church St., New York, N. Y. Meets with Telegraph and Telephone Section of A. A. R.

Railway Tie Association.—Roy M. Edmonds, 507 Shell Bldg., St. Louis, Mo.

Roadmasters' and Maintenance of Way Association.—Miss Lorene Kindred, Room 822, 310 S. Michigan Ave., Chicago, Ill. Annual meeting, September 21-23, 1943, Hotel Sherman, Chicago, Ill.

Signal Appliance Association.—G. A. Nelson, Waterbury Battery Company, 30 Church St., New York, N. Y. Meets with A. A. R. Signal Section.

Southern and Southwestern Railway Club.—A. T. Miller, 4 Hunter St., S. E., Atlanta, Ga. Regular meetings, third Thursday in January, March, May, July, September and November, Ansley Hotel, Atlanta, Ga.

Southern Association of Car Service Officers.—D. W. Brantley, C. of Ga. Ry., Savannah, Ga.

Toronto Railway Club.—D. M. George, P. O. Box 8, Terminal "A," Toronto, Ont. Regular meetings, fourth Monday of each month, except June, July and August, Royal York Hotel, Toronto, Ont.

Track Supply Association.—Lewis Thomas, Q. and C. Company, 59 E. Van Buren St., Chicago, Ill.

United Associations of Railroad Veterans.—Roy E. Collins, 112 Hatfield Place, Port Richmond, Staten Island, N. Y. Annual meeting, October, 1943.

Western Railway Club.—E. E. Thulin (Executive Secretary), 122 S. Michigan Ave., Chicago, Ill. Regular meetings, third Monday of each month, except January, June, July, August and September, Hotel Sherman, Chicago, Ill.

Equipment and Supplies

LOCOMOTIVES

The Central of Georgia is endeavoring to purchase eight steam freight locomotives of 4-8-4 wheel arrangement.

The Nashville, Chattanooga & St. Louis is considering the purchase of 7 or 10 steam freight locomotives of 4-8-4 wheel arrangement.

The Atchison, Topeka & Santa Fe has ordered, subject to approval by the War Production Board, 20 freight locomotives of 4-8-4 wheel arrangement from the Baldwin Locomotive Works.

The Chicago, Milwaukee, St. Paul & Pacific has ordered two 1,000-hp. Diesel-electric locomotives for road and switching service from the American Locomotive Company.

The Western Pacific has placed an order, subject to approval by the War Production Board, for eight Diesel-electric switching locomotives of 1,000 hp. with the American Locomotive Company.

The Lehigh Valley has ordered, subject to the approval of the War Production Board, five 1,000-hp. Diesel-electric switching locomotives from the American Locomotive Company.

The New York, Susquehanna & Western ordered, subject to the approval of the War Production Board, two 1,000-hp. Diesel-electric locomotives for road and switching service from the American Locomotive Company.

The Richmond, Fredericksburg & Potomac has ordered two Diesel-electric switching locomotives of 1,000 hp. from the American Locomotive Company. Authority to build these locomotives has been received from the War Production Board.

The Nevada Consolidated Copper Corporation has ordered one 1,000-hp. Diesel-electric switching locomotive from the Baldwin Locomotive Works. Authorization for this locomotive has been received from the War Production Board and delivery is expected this month.

FREIGHT CARS

The Denver & Rio Grande Western is inquiring for 200 flat cars of 70 tons' capacity.

The Akron, Canton & Youngstown, Northern Ohio, has ordered 50 40-ft. 4-in. steel-frame box cars of 40 tons' capacity for immediate delivery from the Mather Stock Car Company. Authority to build this equipment has been received from the War Production Board.

The Union Pacific has ordered 1,000 41-ft. 50-ton steel-frame gondola cars of composite wood and steel construction from the Pullman-Standard Car Manufacturing Company. Deliveries are expected to begin in 1943. Authority for the building of these cars has been received from the War Production Board.

The Monongahela Connecting has placed orders for 65 38-ft. all-steel gondola cars of 120 tons' capacity for delivery in April, 1943, and for 20 43-ft. all-steel hopper cars of 100 tons' capacity for delivery in May, 1943, with the railroad's own shops. The railroad has received authority to build these freight cars from the War Production Board.

The Norfolk & Western has ordered, subject to the approval of the War Production Board, 100 52-ft. 6-in. 70-ton gondola cars of composite wood and steel construction from the Pressed Steel Car Company, and 25 53-ft. 6-in. 70-ton flat cars of composite wood and steel construction from the Greenville Steel Car Company. The inquiry for this equipment was reported in the *Railway Age* of September 19.

The Colombian National Railways, Colombia, South America, is inquiring for 75 55,100-lb. capacity box cars.

Supply Trade

Fred C. Davern has been appointed manager of railroad sales for the **Standard Oil Company of New Jersey.**

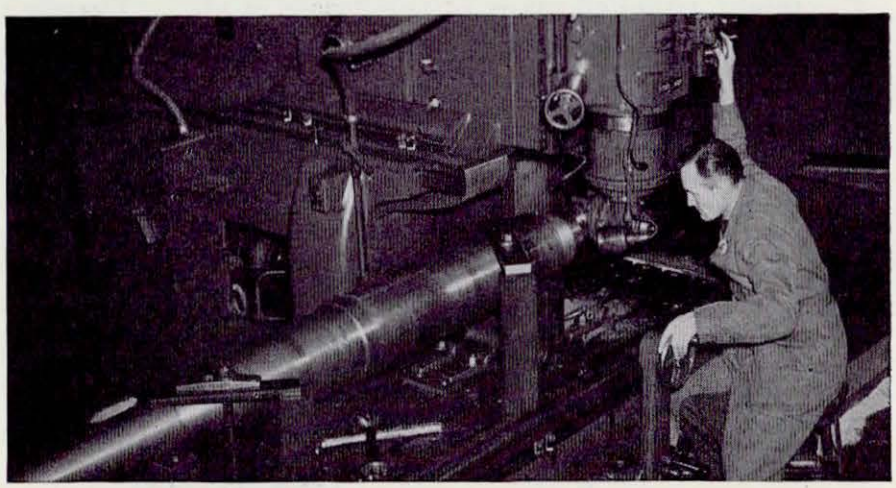
The Army-Navy "E" was awarded to the **Edwards Company,** a division of the Rogers Diesel & Aircraft Corporation of New York on November 30, at Sanford, N. C.

Damon deB. Wack, assistant to the president of the **National Bearing Metals Corporation,** has been elected executive vice-president of that company in active charge of all plants. Until his appointment as assistant to the president of the National Bearing Metals Corporation about a year ago, Mr. Wack was vice-president of the Pacific coast division of the parent corporation, the American Brake Shoe & Foundry Co.

Cecil W. Guyatt, formerly assistant chief industrial engineer, has been named chief industrial engineer of the **American Steel & Wire Co. John S. Conant** has been made priorities administrator, at the same time continuing as general supervisor of production planning, and **Lloyd W. Hackley,** formerly supervisor of production planning in the cold rolled department at the Cuyahoga works in Cleveland, Ohio, has been appointed assistant general supervisor of production planning for the entire company.

Wilson H. Moriarty, assistant to the first vice-president of the **National Malleable & Steel Castings Co.,** has been promoted to the position of assistant to the president, and **Walton L. Woody,** plant

* * *



C.N.R. Munitions Plant Puts Finishing Touches on Naval Guns

News Department continued on next left-hand page

how to help us serve the RAILROADS better

Franklin Railway Supply Company is 100% in war production. Part of this consists of supplying the railroads' needs and the remainder is on direct war contracts.

To insure prompt delivery of repair parts Franklin needs the railroads' help.

here's how

1. Make application for the highest priority to which you are entitled. If this is not received with your order we must ask for an amendment. This means delay in shipping the needed parts.

2. The ordering of small numbers of frequently used repair parts wastes man-power and machine time. Order parts in reasonable quantities. Not more than you require for a normal inventory but not by twos and threes.

Large numbers of small individual orders slow up the supply of everyone's needs. Alterations must be made in machine settings, dies must be changed, thereby slowing down the whole production operation. Purchasing of fabricating materials in small quantities further complicates and delays deliveries.

3. Another procedure that delays deliveries is the ordering of parts that are not within the range of the standard dimensions. A sufficient range of sizes is provided for every repair part to cover 95% of the railroads' requirements. Ordering parts with dimensions outside these standards not only slows production of other repair parts but results in delay in obtaining the special part.

By cooperating in these three requests the railroads are enabling Franklin not only to supply them with parts more promptly but to step up the tempo of Franklin's contribution to the war effort.

FRANKLIN RAILWAY SUPPLY COMPANY, INC. NEW YORK CHICAGO

In Canada: FRANKLIN RAILWAY SUPPLY COMPANY, LIMITED, MONTREAL

manager at Sharon, Pa., has been promoted to the position of assistant to the president in charge of the Sharon, Pa., and Melrose Park, Ill., steel castings plants. Both men have long-term records with National Malleable, Mr. Woody having joined the company 28 years ago and Mr. Moriarty 23 years ago, and both have important metal-

Wilson H. Moriarty

lurgical accomplishments to their credit. Mr. Wood several years ago perfected for industrial use the triplex and duplex methods of melting malleable iron, while Mr. Moriarty has been instrumental in developing and perfecting several types of malleable iron and steel castings now widely used in war production.

Mr. Moriarty was graduated from the Case School in 1918 and served as an officer in the heavy artillery during the first world war. After a training period he became resident inspector at National Malleable's Cleveland, Ohio, plant and later held similar positions in the East St. Louis, Mo., and Chicago plants. In 1927 he was appointed chief inspector for all of the company's plants. Three years later he was

Walton L. Woody

appointed sales engineer at the Cleveland plant, and in 1939 became that plant's sales manager. He was promoted to the position of assistant to the first vice-president in June, 1942.

Mr. Woody joined National Malleable's Indianapolis, Ind., plant in 1914, immediately after graduation from the Rose Polytechnic Institute, Terre Haute, Ind. He was transferred to Cleveland in the same year and established the company's first chemical laboratory. He later became metallurgist and assistant superintendent in Cleveland, and in 1925 was appointed plant manager. In 1926 he acted as manager of the Chicago plant, returning to Cleveland later in the same year, where he remained until 1938, when he became plant manager at Sharon, his present headquarters. Mr. Woody directed the modernization of the Cleveland, Sharon and Melrose Park plants. Under his direction the Sharon and Melrose Park plants are now completing expansion programs to take care of steel castings for tanks and anchor chain for the U. S. Navy, in addition to their usual railroad work. Mr. Woody is a director of the American Foundrymen's Association.

OBITUARY

William H. Fenley, western manager of the Kerite Insulated Wire and Cable Company, with headquarters at Chicago, died in that city on November 22, as reported in the *Railway Age* of November 28.

William H. Fenley

Mr. Fenley was born at Greenwood, Ind., May 7, 1876, and entered railway service in September, 1895, as a brakeman of the Cleveland, Cincinnati, Chicago & St. Louis. In the following year he was promoted to yard master and in 1898 was employed by the National Switch & Signal Co. In the same year he returned to the Big Four, where for two years he was towerman and signal maintainer. He resigned in 1900 to enter the employ of the Chicago Great Western and during the next 11 years held the positions of signal foreman, electrician, signal inspector, signal supervisor, office engineer and signal engineer. In 1911, he was a sales engineer of the Union Switch & Signal Co. and in September of that year became signal engineer of the Panama Railroad, where he put "standard code" train operation in effect and later became superintendent of telephone, telegraph and signals. He also built the trans-Isthmian duct line and underground conduit in the Panama fortifications. In June, 1915, he entered the employ of the Kerite Insulated Wire & Cable Co. and in 1922 was promoted to western manager. He was president of the National Railway Appliances Association in 1930-31 and president of the Railway Electric Supply Manufacturers Association in 1925-29.

Robert H. Weatherly, president of the Pilliod Company since 1910, died December 1. He was 68 years of age. During his career Mr. Weatherly had been an assistant superintendent with the Scarritt Car Seat Works; assistant to the vice-president of the American Steel Foundries; and vice-president of the Scullin Steel Company.

Financial

ATLANTIC COAST LINE.—*Increases Common Dividend.*—The Atlantic Coast Line has declared a common dividend of $2.00 per share payable December 23. This compares with a common dividend of $1.00 per share paid December 23, 1941, which was the first common disbursement since December 23, 1937, when $1.50 was paid.

BALTIMORE & OHIO.—*Alton Petition for Reorganization.*—The Alton on November 25 filed a petition in the federal district court for the Northern Illinois District, Eastern Division, for reorganization under Section 77 of the Bankruptcy Act, and on the same day submitted a proposed plan for reorganization, filed with the Interstate Commerce Commission in Finance Docket 14030. This action followed formal notice given the previous day by the Baltimore & Ohio of termination, as of December 24, of an agreement for the allocation of current Alton net earnings between maintenance, working capital, and bond interest, which had been in effect since June 15, 1942. The Baltimore & Ohio owns all Alton stock outstanding.

In its petition to the court the company stated that it is unable to meet accrued indebtedness and cannot obtain funds with which to meet it. It outlined also plans which have been proposed by the company and the Baltimore & Ohio to the principal debtors to effect a readjustment of its obligations and fixed charges, and the proposal made by representatives of a majority of the bondholders that the Baltimore & Ohio advance additional capital to the Alton. None of these plans has been acceptable to the parties to which they were submitted, so reorganization is now proposed under a plan accompanying the petition.

The present indebtedness of the Alton consists mainly of $45,350,000 in 3 per cent refunding mortgage bonds, on which certain interest charges have accrued, making the total claim of these bondholders against the company $48,411,125 as of December 31, 1942. In addition the company is liable for rentals on leased lines equivalent to dividends on $1,500,000 of Joliet & Chicago 7 per cent stock, $1,750,000 of Kansas City, St. Louis & Chicago 6 per cent stock, and $329,000 of Louisiana & Missouri River 7 per cent stock. Claims of the Baltimore & Ohio against the Alton,

News Department continued on next left-hand page

FUEL

a strategic material

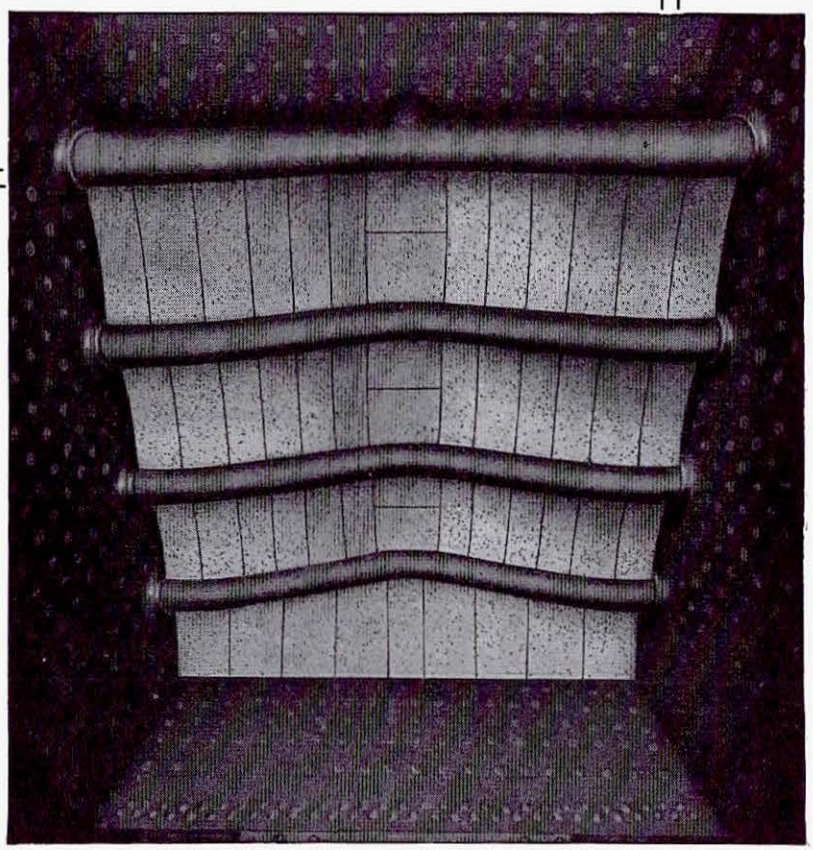
CONSERVED

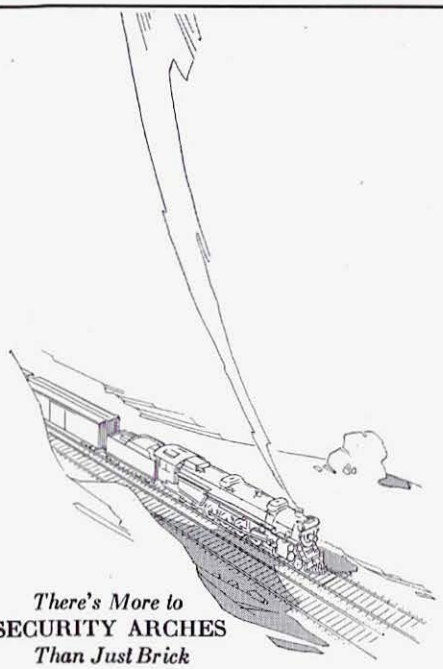
with Security Sectional Arches

Today, more than ever, fuel is one of our strategic materials. Making every pound of fuel produce the maximum amount of steam not only conserves this strategic material but also the cars required to transport it.

For over 32 years, Security Sectional Arches have been saving fuel on all types of steam locomotives.

But experience has proved that only with a *complete* Arch can maximum fuel economy be realized.

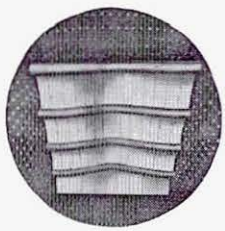




There's More to
SECURITY ARCHES
Than Just Brick

HARBISON-WALKER REFRACTORIES CO.

Refractory Specialists



AMERICAN ARCH CO.
INCORPORATED
60 EAST 42nd STREET, NEW YORK, N. Y.

Locomotive Combustion Specialists

assigned to the Reconstruction Finance Corporation, amount to $9,739,973.

The company's plan of reorganization proposes that all fixed charges be eliminated except leased line rentals, amounting to $105,000 annually for the Joliet & Chicago, $23,030 for the Louisiana & Missouri River, and $52,500 for the Kansas City, St. Louis & Chicago, the rate of payment on the latter being reduced to 3 per cent. Present bondholders would receive 4 per cent income bonds in the amount of $24,205,562, on which the annual contingent interest charges would be $968,222. In addition, the present bondholders would receive all of the common stock of the new company, to consist of 242,055 shares without par value, but an undetermined number of shares of this stock would be turned over to the Baltimore & Ohio in satisfaction of its claim against the present company, and would be assigned to the Reconstruction Finance Corporation as security in substitution for claims against the Alton now held by it.

CENTRAL OF NEW JERSEY.—*Seeks Tax Ruling Review.*—The Central of New Jersey on November 30 notified the state board of tax appeals and the city of Jersey City, N. J., of its intention to ask a review by the supreme court of a ruling made November 4 by the state board on the railroad's appeal from property tax assessments and franchise tax levies for 1942. The ruling reduced the 1942 assessments on the railroad's second-class property in Jersey City, but this loss to the city was offset in part by an accompanying increase in revenue from the railroad franchise tax. The railroad contended that the ruling was contrary to the provisions of the railroad-tax laws as far as the franchise levy was concerned.

CHICAGO, BURLINGTON & QUINCY.—*Increases Common Dividend.*—This railroad has declared a common dividend of $3.00 per share, payable December 22. This compares with common dividends of $2.00 paid in December of each year from 1937 to 1941, inclusive.

FORT DODGE, DES MOINES & SOUTHERN. —*Reorganization.*—The reorganization committee for this road has filed with the Interstate Commerce Commission a petition in Finance Docket No. 12545, seeking authority for the newly-organized Fort Dodge, Des Moines & Southern Railway Company to take over the properties of the Fort Dodge, Des Moines & Southern Railroad Company. The petition seeks a commission finding approving the acquisition and operation of the property in accordance with the confirmed plan of reorganization; also, approval of the issuance by the Railway Company of $2,260,000 of four per cent income mortgage bonds maturing December 31, 1991, and 141,250 shares of common stock of $10 par value, as described in the plan.

NEW YORK, NEW HAVEN & HARTFORD.—*Asks Authority to Make Interest Payment.* —Trustees Howard S. Palmer, James Lee Loomis and Henry B. Sawyer of the New Haven on December 1 petitioned the federal court for authority to pay approximately $11,200,000 in interest. This payment would bring total interest payments for the year on the underlying and first and refunding mortgage bonds to $25,096,300. The coupons to be paid are: the Central New England's two coupons due July 1, 1942, and January 1, 1943; two coupons on each issue due July 1, 1942, and January 1, 1943, of the New England; the Harlem River & Portchester coupon due November 1, 1942; the Housatonic interest due November 1, 1942; the Danbury & Norwalk coupon due December 1, 1942; the New Haven & Northampton coupon due December 1, 1942; and two coupons on the first and refunding mortgage bonds outstanding, including bonds pledged as collateral. Judge Carroll C. Hincks set December 11 as the time for hearing on the recommendation.

LOUISVILLE & NASHVILLE.—*Increases Common Dividend.*—Directors of the Louisville & Nashville have declared a common dividend of $2.00 per share payable December 23, bringing total common disbursements this year to $8.00. This compares with a total of $7.00 disbursed in 1941.

Average Prices of Stocks and Bonds

	Dec. 1	Last week	Last year
Average price of 20 representative railway stocks..	28.25	28.63	28.31
Average price of 20 representative railway bonds..	67.03	68.16	62.91

Dividends Declared

Alabama Great Southern.—Ordinary, $4.50; 6 Per Cent Participating Preferred, $4.50, both payable December 24 to holders of record December 5.

Beech Creek.—50c, quarterly, payable January 2, 1943, to holders of record December 15.

Boston & Albany.—$2.25, quarterly, payable December 31 to holders of record November 30.

Chicago, South Shore & South Bend.—$1.00, semi-annually; $2.00, extra, both payable December 15 to holders of record December 7.

Kansas, Oklahoma & Gulf.—6 Per Cent Preferred A, $3.00, semi-annually; 6 Per Cent Preferred B, $3.00, semi-annually; 6 Per Cent Preferred C, $3.00, all three payable December 1 to holders of record November 21.

New York & Harlem.—$2.50, semi-annually; Preferred, $2.50, semi-annually, both payable January 2, 1943 to holders of record December 15.

Reading Company.—Second Preferred, 50c, quarterly, payable January 14, 1943, to holders of record December 24.

Texas Electric.—(Liquidating) $3.00, payable December 1 to holders of record November 24.

Union Pacific.—$1.50, quarterly, payable January 2, 1943, to holders of record December 5.

Construction

NASHVILLE, CHATTANOOGA & ST. LOUIS. —The Tennessee Department of Highways and Public Works has awarded a contract amounting to about $287,700 to H. B. Garrett, Ashland, Ala., for the construction of a reinforced concrete highway bridge and approaches over tracks of the N. C. & St. L. in Tullahoma, Tenn.

ST. LOUIS-SAN FRANCISCO.—The U. S. Engineer Office, Denison, Tex., has awarded a contract amounting to approximately $550,000 to the Austin Bridge Company, Dallas, Tex., and the Austin Contracting Company, Denison, Tex., for the relocation of 3.1 miles of line between Randolph, Okla., and Ravia, for the Denison dam and reservoir on the Red river.

Abandonments

BOSTON & MAINE.—This road and the Suncook Valley have applied to the Interstate Commerce Commission for authority, respectively, to abandon and abandon operation of a line extending from a point near the boundary of the towns of Allenstown, N. H., and Pembroke to a point on the east bank of the Merrimack river in Hooksett.

BOSTON & MAINE.—Division 4 of the Interstate Commerce Commission has authorized this road to abandon its branch from Hamilton, Mass., to Essex, 5.17 miles. In a dissenting opinion Commissioner Porter proposed that abandonment be deferred for one year because of the uncertain rubber and gasoline situation, pointing out that operation of the branch at present results in only small losses.

CHICAGO & EASTERN ILLINOIS.—Division 4 of the Interstate Commerce Commission has authorized this road to abandon a 1.46-mile segment of its Sullivan County branch near Standard, Ind.

CHICAGO, ROCK ISLAND & PACIFIC.—Examiner Ralph H. Jewell has recommended that the Office of Defense Transportation certify to the War Production Board that this road's branch from Deshler, Neb., to Ruskin, 8.06 miles, is not essential to war transportation.

MISSISSIPPI EASTERN.—Division 4 of the Interstate Commerce Commission has authorized this road to abandon its entire line from Quitman, Miss., to Crandall, 15.84 miles.

NEZPERCE & IDAHO.—Examiner Ralph H. Jewell has recommended that the Office of Defense Transportation certify to the War Production Board that this road's 13.8-mile line from Nezperce, Ida., to Craigmont is not essential to war transportation.

PENNSYLVANIA.—The Western Allegheny has applied to the Interstate Commerce Commission for authority to abandon a one-mile line between Dewey, Pa., and Brady's Bend.

PENNSYLVANIA - READING SEASHORE LINES.—This road and the West Jersey & Seashore have filed with the Interstate Commerce Commission a joint application seeking authority, respectively, to abandon operation of and abandon the latter's 4.7-mile line between Daretown, N. J., and Oakland.

READING.—Division 4 of the Interstate Commerce Commission has authorized this road to abandon a 0.26-mile segment at the end of its North Mahanoy Colliery branch near Mahanoy City, Pa.

TEXAS & PACIFIC.—Examiner Ralph H. Jewell has recommended that the Office of Defense Transportation certify to the War Production Board that this road's line from Ville Platte, La., to Eunice, approximately 15 miles, is not essential to war transportation.

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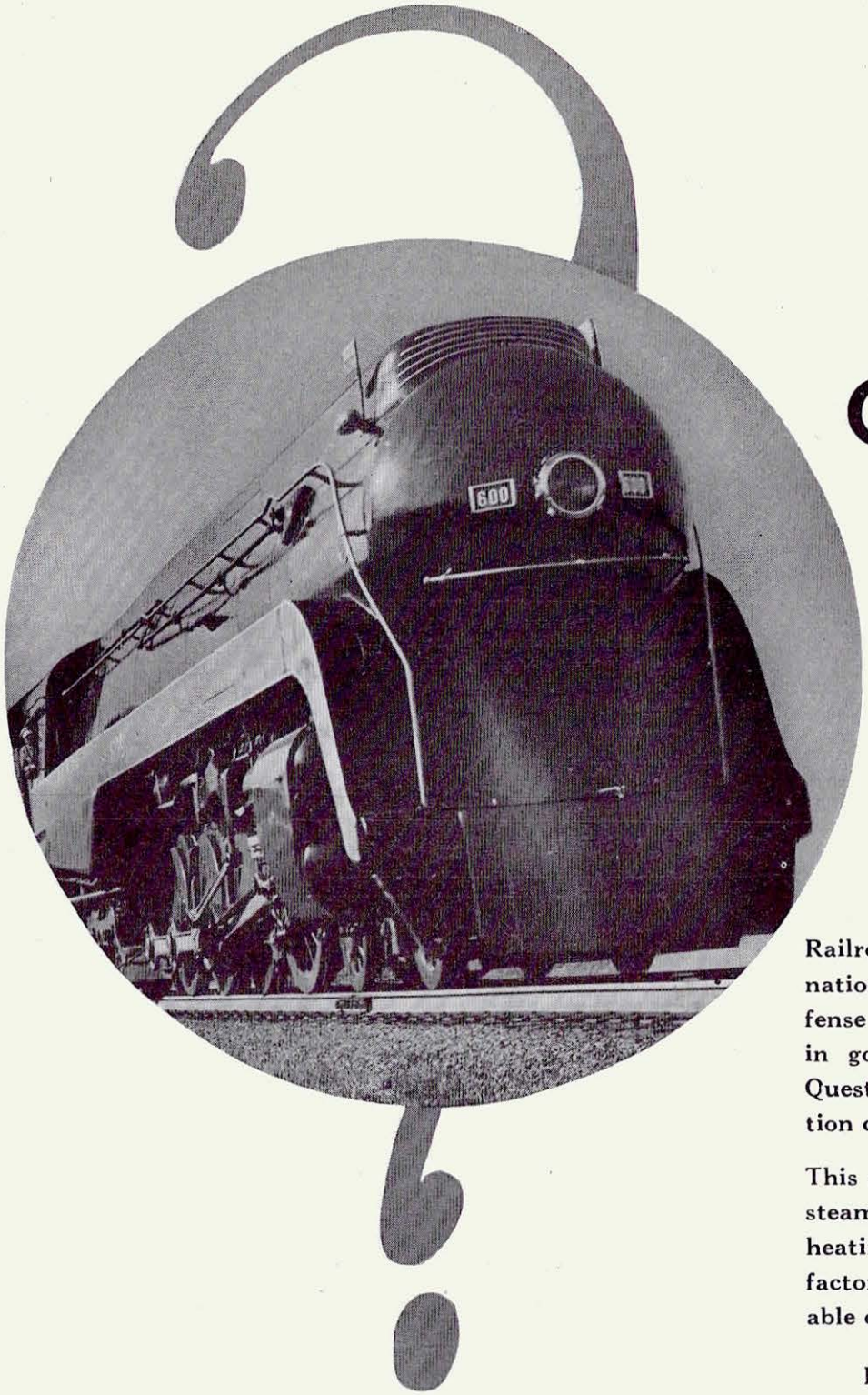

Not A Question But A *Must*

Railroads are important to our nation's transportation and defense . . . they MUST be kept in good operating condition. Questionable operating condition cannot be tolerated.

This calls for well maintained steam generating and superheating surfaces . . . both vital factors to efficient and dependable operation.

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Railway Officers

EXECUTIVE

L. A. Putnam, vice-president of the St. Johnsbury & Lake Champlain, Montpelier & Wells River and the Barre & Chelsea at Montpelier, Vt., has resigned from those posts, and has accepted appointment as assistant to the vice-president of finance and accounting of the Boston & Maine at Boston, Mass.

W. W. Hale, whose promotion to vice-president in charge of system freight traffic of the Southern Pacific to succeed **J. T. Saunders,** deceased, was announced in the *Railway Age* of November 28, first entered railroad service on the Southern Pacific in 1901 as a clerk in the general passenger office at San Francisco, Cal. He was transferred to the office of the superintendent of transportation in 1904, and in 1917 he was promoted to Eastern car service agent, with headquarters at Chicago. During federal control of the railroads, Mr. Hale became assistant manager of the refrigerator department of the Car Service section of the United States Railroad Administration. With the termination of government control, he returned to the service of the Southern Pacific as general agent at Detroit, Mich., and in April, 1929, he was promoted to assistant to the freight traffic manager, with headquarters at San Francisco. In January, 1932, he was appointed general freight agent at Portland, Ore., and on August 1, 1934, he was promoted to general freight traffic manager of the Southern Pacific Lines in Texas and Louisiana, with headquarters at Houston, Tex. In 1938 he was promoted to general traffic manager at Chicago.

W. W. Hale

FINANCIAL, LEGAL AND ACCOUNTING

Thomas E. Conlon, tax agent of the Baltimore & Ohio, has been appointed general tax agent, with headquarters as before at Baltimore, Md., and **J. Harry Garmer,** assistant tax agent, has been appointed tax agent, at Baltimore, succeeding Mr. Conlon. Mr. Conlon was born on June 27, 1883, at Toledo, Ohio, and was graduated from De La Salle Academy, Toledo, and the University of Baltimore Law School, becoming a member of the bar in 1928. He entered railroad service with the Baltimore & Ohio at Toledo in December, 1900, as stenographer in the division freight agent's office. In November, 1903, he was transferred to the general freight office in Pittsburgh, Pa., becoming stenographer and chief clerk there in February, 1904. Mr. Conlon was promoted to secretary to division freight agent in May, 1904, and to secretary to general freight agent in May, 1906. He was appointed traveling freight agent at Connellsville, Pa., in 1914, and in 1918 went to Baltimore as supervisor of freight suits for the entire system, his work consisting of preparation of law suits growing out of loss and damage to freight. On January 1, 1940, Mr. Conlon was promoted to assistant general freight claim agent, and in May, 1941, he became tax agent, in which capacity he served until his recent appointment to general tax agent.

Thomas E. Conlon

OPERATING

The jurisdiction of the superintendent of the Montreal terminals division of the Canadian National has been extended to include the St. Jerome division.

T. J. Klauenberg, trainmaster of the Baltimore division of the Baltimore & Ohio, has been appointed assistant superintendent of that division, with headquarters at Baltimore, Md. **J. H. Bradford** has been appointed to succeed Mr. Klauenberg as trainmaster of the Baltimore division.

V. A. Gordon, assistant trainmaster of the Missouri Pacific at Van Buren, Ark., has been promoted to trainmaster at Jefferson City, Mo., succeeding **E. M. Bishop,** who has been granted a leave of absence for special government service with the American Railroad Mission in Mexico.

Bertram W. Switzer, passenger yardmaster of the Boston & Maine, has recently been promoted to passenger trainmaster, with headquarters as before at Boston, Mass. In his new position, Mr. Switzer has general supervision over all passenger yard work and towers in the Boston Terminal.

P. H. Fox, superintendent of the Canadian National at Allandale, Ont., has been transferred to the Ottawa division, with headquarters at Ottawa, Ont., succeeding **J. A. Rogers,** who has been promoted to assistant general superintendent of the Alberta division, with headquarters at Edmonton, Alta.

N. H. Lockney, assistant superintendent of the Louisville & Nashville at Middlesboro, Ky., has been promoted to superintendent of the Knoxville and Atlanta division, succeeding **S. H. Fulkerson,** who has been transferred to the Louisville division, with headquarters at Louisville, Ky., succeeding **C. D. Love,** who has been assigned to other duties.

Charles Reid, whose promotion to superintendent of the Canadian Pacific at Moose Jaw, Sask., was reported in the *Railway Age* of October 31, was born at Blairgowrie, Scotland, in 1890 and entered railway service as a fireman of the Canadian Pacific in 1908. In 1913 he was promoted to engineman at Winnipeg, Man., and in July, 1940, was promoted to assistant superintendent at Kenora, Ont., the position he was holding at the time of his recent promotion.

Charles Reid

O. L. Harstad, general manager of the Chicago, Milwaukee, St. Paul & Pacific, has been granted a leave of absence to serve with the Office of Defense Transportation, effective December 1, and **J. T. Gillick,** chief operating officer, will take over the duties of general manager of the Eastern lines. **J. P. Kiley,** auditor of investment and joint facility accounts, has been promoted to assistant to the general manager.

John Hewes, Jr., who was granted a leave of absence to accept service in the Quartermaster department of the United States Army at Washington, D. C., (reported in the *Railway Age* of March 7, 1942), has completed his assignment and has resumed his former duties as superintendent of car service of the Baltimore & Ohio, with headquarters at Baltimore. **E. R. Gaither,** who took over Mr. Hewes' duties

in his absence, likewise returns to his former position as chief clerk to the superintendent of car service.

Challence O. Hooker, whose promotion to superintendent of the Great Northern with headquarters at Whitefish, Mont., was reported in the *Railway Age* of November 14, was born at Owasco, Ind., on March 12, 1889, and entered railway service on October 20, 1909, as a brakeman of the Great Northern at Minot, N. D. During the period from 1909 to 1919 he served as brakeman, conductor and trainmaster on the Minot division and during World War I served in the armed forces overseas. He returned to the Great Northern after the war and held the positions of brakeman, conductor and trainmaster. On July 1, 1935, he was made trainmaster of the Minot division and on February 27, 1937, was transferred to terminal trainmaster at Minot. He held this position until October 1, 1942, when he was made trainmaster at Minneapolis, Minn., the position he was holding at the time of his recent promotion.

Walter E. Davis, whose promotion to superintendent of the Illinois Central at McComb, Miss., was reported in the *Railway Age* of October 31, was born at Princeton, Ky., on February 14, 1893, and entered railway service as a messenger of the Illinois Central at Princeton, on September 1, 1908. Subsequently he held the positions of operator, clerk to the chief dispatcher, dispatcher, and assistant chief dispatched at Princeton. In 1932 he was appointed dispatcher at Memphis, Tenn., and in the following year served as acting general yardmaster at Louisville, Ky. In 1934, he was made dispatcher at Paducah, Ky., and in 1936, was promoted to assistant chief dispatcher at Paducah. On November 1, 1939, he was promoted to acting trainmaster and on February 1, 1940, to trainmaster at Louisville, the position he was holding at the time of his recent promotion.

Walter E. Davis

Howard W. McCauley, whose promotion to superintendent of the Yellowstone division of the Northern Pacific with headquarters at Glendive, Mont., was reported in the *Railway Age* of November 21, was born at St. Paul, Minn., on June 29, 1897, and attended the College of St. Thomas at St. Paul, Minn., and the University of Minnesota. During summer vacations he worked in the office of the car accountant of the Northern Pacific and in February, 1918, became regularly employed in the engineering department of the Chicago, St. Paul, Minneapolis & Omaha at St. Paul.

Howard W. McCauley

Later that year he worked in the engineering department of the Great Northern at Superior, Wisc., and in 1920 transferred to the valuation accounting department at St. Paul. In 1923, he returned to the engineering department of the Northern Pacific and on April 1, 1924, was promoted to bridge inspector at Glendive. After serving as roadmaster at Carrington, N. D., Staples, Minn., Tacoma, Wash., Mandan, N. D., and Helena, Mont., and division roadmaster at Minneapolis, Minn., he was made trainmaster-roadmaster of the Minnesota & International (a subsidiary of the Northern Pacific) at Bemidji, Minn., on December 1, 1937. On November 1, 1939, he was made trainmaster at Jamestown, N. D., and on April 1, 1942, he was promoted to superintendent of ore operations at Superior, which position he held until his recent promotion.

E. W. Cameron, assistant superintendent of the Canadian National at London, Ont., has been appointed acting superintendent, Allandale division, with headquarters at Allandale, Ont., succeeding **P. H. Fox,** whose appointment is noted elsewhere in these columns. **J. H. Stevenson,** assistant superintendent at Lindsay, Ont., has been transferred to London, succeeding Mr. Cameron. **E. L. Welte,** assistant superintendent at Hornepayne, Ont., has been transferred to Lindsay, succeeding Mr. Stevenson, and **A. E. McCullough** succeeds Mr. Welte as assistant superintendent at Hornepayne. **J. A. Nobert,** assistant superintendent, Laurentian division, Quebec district, has been transferred to the St. Jerome division and the Mount Royal subdivision, with headquarters as before at Montreal, Que. **N. A. Levia,** trainmaster, Laurentian division, Quebec district, has been transferred to the St. Jerome division, with headquarters at Joliette, Que.

TRAFFIC

Walter H. Morrow, commercial agent of the New York, Ontario & Western, has been appointed general agent, with headquarters at Pittsburgh, Pa.

E. J. Colburn has been appointed general agent, freight traffic department, of the New York Central, with headquarters at Springfield, Mass.

The New York traffic offices of the Chesapeake & Ohio and the Pere Marquette, formerly located at 209 Broadway, have been moved to the Woolworth building, 233 Broadway.

C. C. Sampson, traveling freight agent of the New York Central at Charleston, W. Va., has been promoted to traveling freight agent at Tulsa, Okla., succeeding **S. D. Powers,** deceased.

Darl B. Ransburg, who has been promoted to general passenger agent of the Minneapolis & St. Louis, as reported in the *Railway Age* of November 14, was born in Edgerton, Ohio, on June 8, 1881, and entered railway service with the Chicago, Rock Island & Pacific on July 1, 1902. On January 1, 1905, he entered the employ of the Minneapolis & St. Louis as a clerk in the city ticket office at Minneapolis, Minn., and after serving as depot ticket agent and city passenger agent, was promoted, on February 1, 1910, to chief clerk in the general passenger department. On July 1, 1937, he was promoted to assistant general passenger agent, the position he was holding at the time of his recent promotion.

Darl B. Ransburg

E. P. Sprigg has been appointed acting district freight agent of the Canadian Pacific and the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Philadelphia, Pa., succeeding **F. T. Foy,** who has been transferred.

John C. Turner, traveling passenger agent of the Illinois Central at New York, has been promoted to eastern passenger agent, with the same headquarters, succeeding **J. J. McLane,** assigned to other duties.

Edward J. Leonard has been appointed general agent, passenger department, of

News Department continued on second left-hand page

the New York Central, with headquarters at Omaha, Nebr., succeeding **John F. Dyas,** who has retired at his own request, because of ill health, after more than 37 years of service.

R. Stanley Souther, district freight agent of the Southern has been appointed New England freight agent, with headquarters as before at Boston, Mass., succeeding **Hayward D. Luckett,** who has been appointed assistant general freight and passenger agent, with headquarters at Columbus, Ga.

Frank J. Kinney, general agent of the New York, Ontario & Western at New Haven, Conn., has been promoted to general freight agent—rates and divisions, with headquarters at New York. **Don R. Gann,** commercial agent, succeeds Mr. Kinney as general agent, with headquarters as before at New Haven. Mr. Kinney was born on February 3, 1899, at New Haven, Conn., and received his education in the public and high schools, and the Commercial Business College, New Haven. From 1916 to 1918 he was employed in the New Haven freight offices of the New York, New Haven & Hartford and the New England Steamship Company, entering the United States Army in the latter year. He returned to civilian life in 1919, and in March of that year entered the services of the New Haven Carriage Company, remaining with that concern until March, 1923, when he was employed by the Trunk Line Association. In January, 1924, Mr. Kinney became clerk and freight representative in the traffic department of the Pennsylvania at New Haven, and in August, 1931, was transferred to Boston, Mass. He left the employ of the Pennsylvania on April 15, 1939, to accept the position of general agent of the New York, Ontario & Western, with headquarters at New Haven, in which capacity he served until his recent promotion.

Frank J. Kinney

Carlton F. Heard, whose promotion to general freight agent of the Boston & Maine at Boston, Mass., was announced in the *Railway Age* of November 21, was born on March 24, 1900, at Manchester, N. H. He received his A.B. degree from Amherst college in 1921, and his B.S. in Civil Engineering from Harvard university, engineering school, in 1923. Mr. Heard entered railway service in September, 1923, as a clerk at the Billerca shops of the Boston & Maine. One month later, he was transferred to Enfield, N. H., and in August, 1924, he was again transferred, this time to the general freight office at Boston. In January, 1926, he was promoted to chief rate clerk in the same office at Boston, and in April, 1928, Mr. Heard was advanced to assistant general freight agent at Boston. He was holding this latter position at the time of his promotion to general freight agent, which was effective on November 2. Mr. Heard is a member of the Traffic Club of New England.

Carlton F. Heard

Oscar C. Stein, general freight agent of the Illinois Central at New Orleans, La., has been promoted to assistant freight traffic manager, with the same headquarters, succeeding **Robert D. Reeves,** who has been granted a leave of absence because of illness. Mr. Stein was born at New Orleans on February 7, 1888, and entered railway service on March 1, 1902, as a messenger in the local freight office of the Illinois Central at New Orleans, later serving at that point as tracer clerk, rate and bill of lading clerk, contracting freight agent, city freight agent, chief clerk in the general freight department and assistant general freight agent. On February 20, 1932, he was advanced to general freight agent at New Orleans, which position he held until his recent promotion, effective November 16.

PURCHASES AND STORES

L. L. Studer, district storekeeper of the Missouri Pacific at Sedalia, Mo., has been granted a leave of absence for special government service with the American Railroad Mission in Mexico.

ENGINEERING & SIGNALING

The jurisdiction of the terminal engineer of the Montreal terminal division of the Canadian National, has been extended to include the St. Jerome division.

Thomas L. Landers, regional engineer, maintenance of way, of the Atlantic region of the Canadian National has been appointed chief engineer of the Atlantic region, with headquarters as before at Moncton, N. B., succeeding **Frederick O. Condon,** who has retired after 49 years of service.

OBITUARY

Frederic A. Pullman, who retired on June 1, 1942, as acting general passenger agent of the Pullman Company, with headquarters at Chicago, died on November 21 at Detroit, Mich., after being in poor health for about a year.

William Atwill, retired vice-president and general manager of the Illinois Central, died on November 27 at the Presbyterian hospital in Chicago. Mr. Atwill retired on January 1, 1940, after 45 years with the railroad. He started as a telegraph operator, was promoted to train dispatcher, and continued to advance as chief dispatcher, trainmaster, division superintendent, and general superintendent. In 1929 he became general manager of the railroad, and in 1934 he was made vice-president and general manager.

Samuel V. Bevington, assistant division superintendent of the New York Central (Big Four) at Cincinnati, Ohio, and at one time superintendent of terminals at Cincinnati, died on November 12. Mr. Bevington was born at Harrison, Ohio, and entered railway service in 1893 as a fireman of the Big Four. He was promoted to locomotive engineer in 1901 and in 1912 was advanced to road foreman of engines. In 1916 he was promoted to assistant trainmaster, later being advanced to trainmaster and then to assistant superintendent of the Cincinnati-Sandusky division, with headquarters at Springfield, Ohio. In 1924 he was promoted to superintendent of terminals at Cincinnati and in 1933 his title was changed to assistant superintendent of terminals at that point. Mr. Bevington was later appointed assistant division superintendent, with the same headquarters.

F. W. Pfleging, general signal engineer of the Union Pacific system, with headquarters at Omaha, Neb., died on November 17 after a long illness. Mr. Pfleging was born at Terre Haute, Ind., on May 27, 1877, and graduated in electrical engineering from Rose Polytechnic Institute in 1901. He first entered railway service in 1899 as a signal repair man on the Chicago & Eastern Illinois, working for a year prior to his graduation from college. In July, 1901, he went with the Union Pacific as a draftsman, later being appointed successively signal maintainer, inspector, foreman and general foreman. On January 1, 1903, Mr. Pfleging was promoted to signal supervisor at Cheyenne, Wyo., and in February, 1912, he was transferred to Kansas City, Mo. On July 1, 1912, he was promoted to signal engineer of the Union Pacific, with headquarters at Omaha. His jurisdiction was extended over all districts of the Union Pacific System on January 1, 1936, and in August, 1941, his title was changed to general signal engineer, with the same headquarters. He was granted a leave of absence because of ill health in June, 1942. Mr. Pfleging was chairman of the Signal Section of the A. A. R. in 1921.

Table of Freight Operating Statistics appears on next left-hand page

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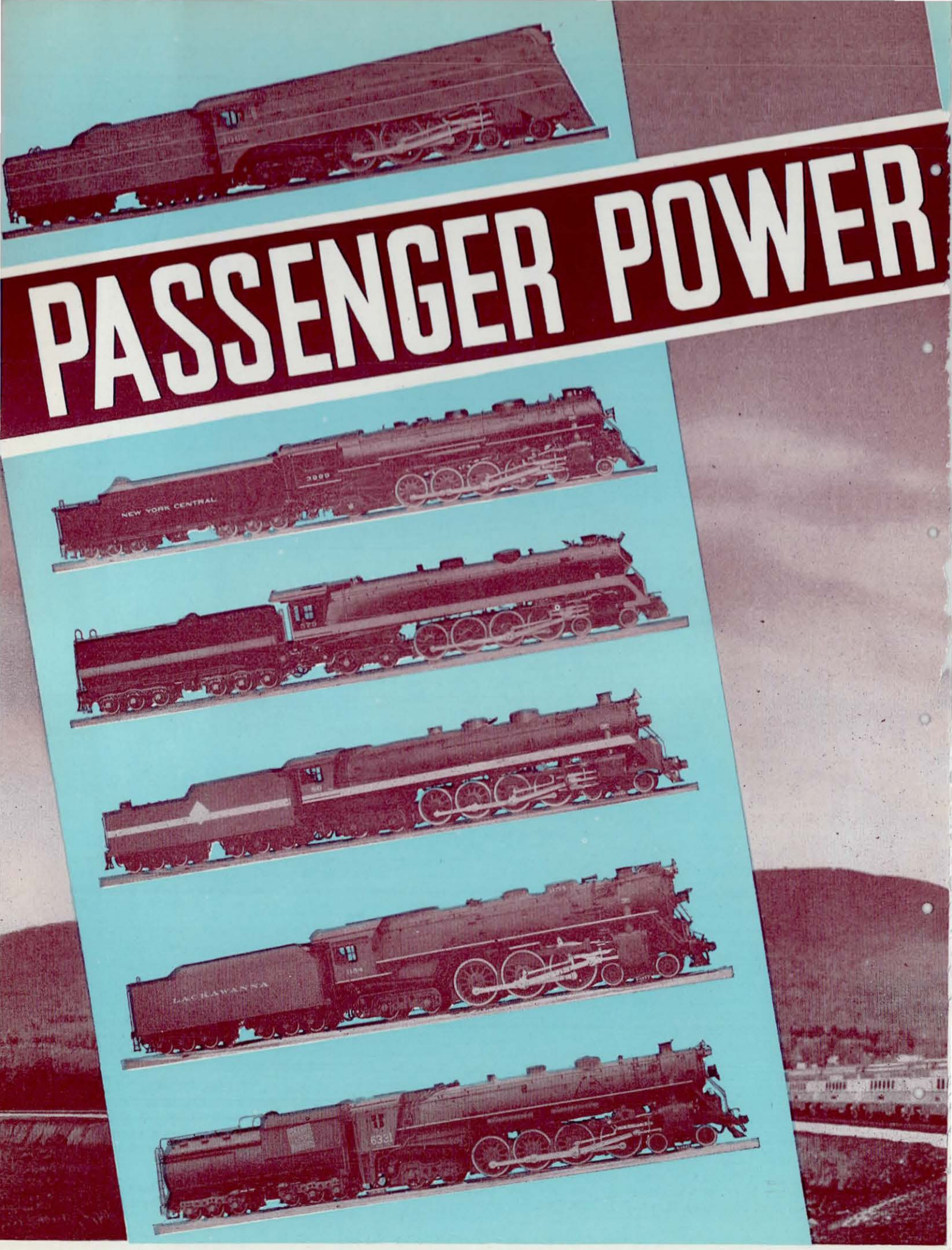
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LACKAWANNA
AMERICAN LOCOMOTIVE COMPANY

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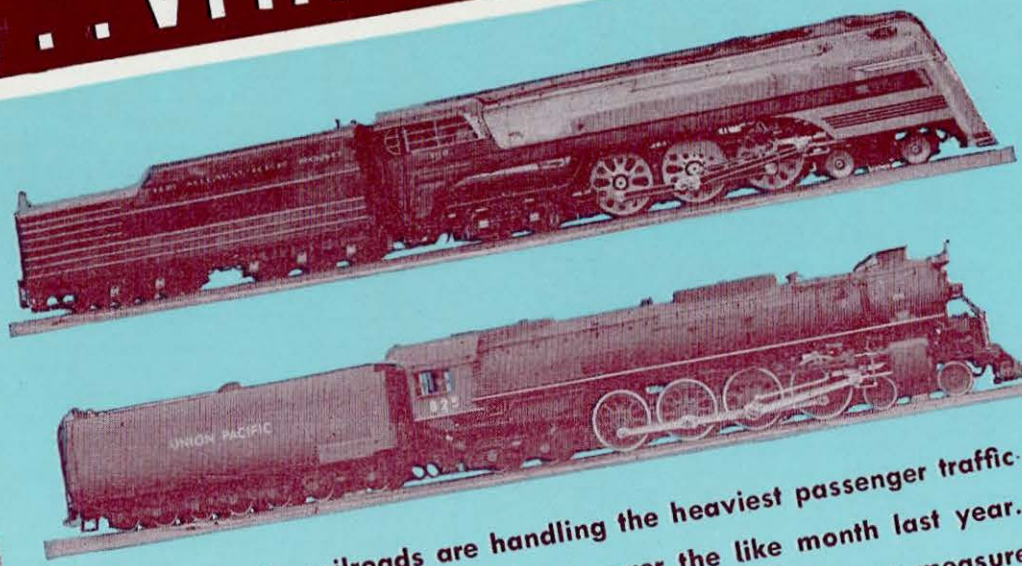
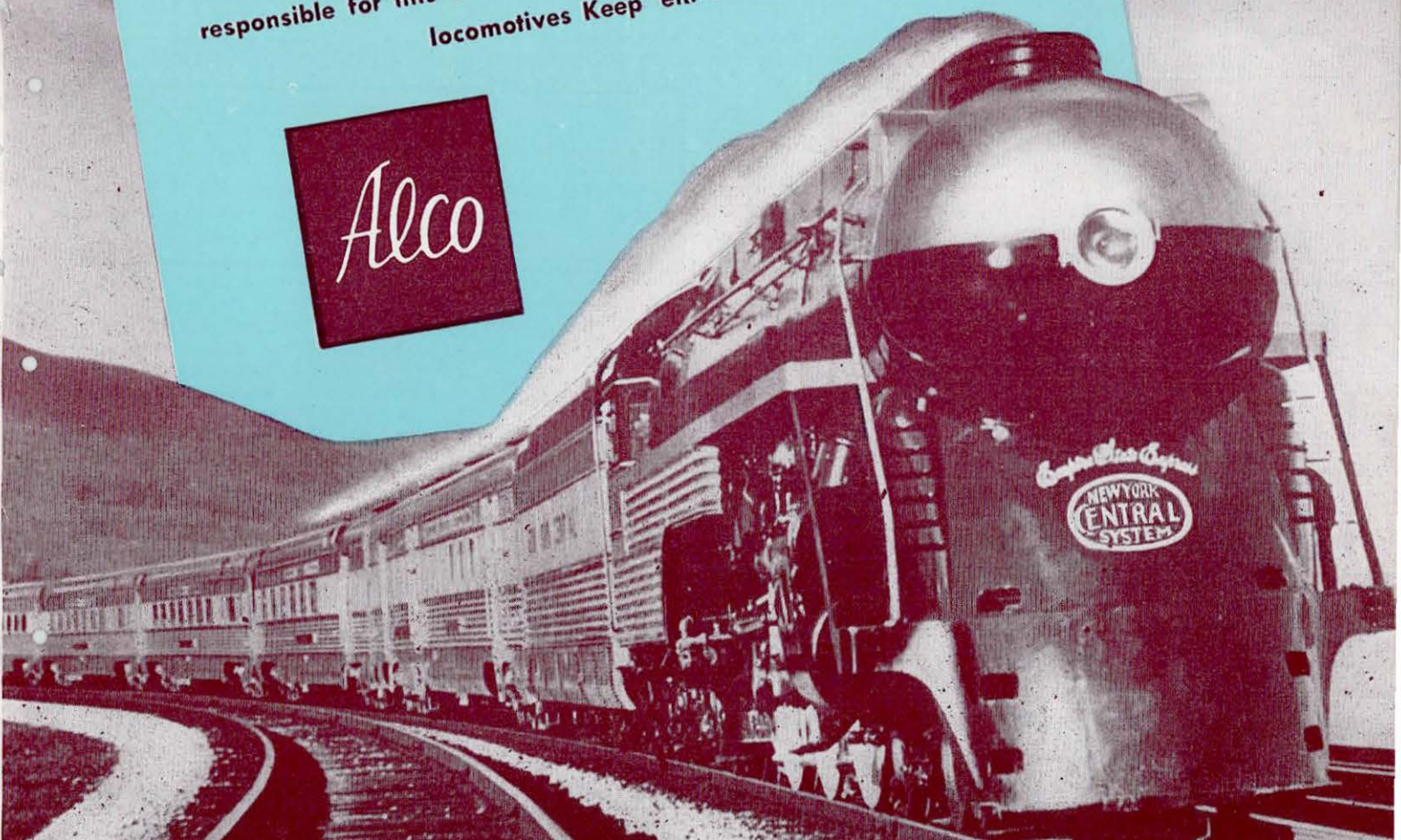


Right now the railroads are handling the heaviest passenger traffic on record—up 65 per cent in June over the like month last year. Powerful steam locomotives of proven design are in large measure responsible for this excellent showing. Dependable modern steam locomotives Keep 'em Rolling.

Alco



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OBITUARY

Frederic A. Pullman, who retired on June 1, 1942, as acting general passenger agent of the Pullman Company, with headquarters at Chicago, died on November 21 at Detroit, Mich., after being in poor health for about a year.

William Atwill, retired vice-president and general manager of the Illinois Central, died on November 27 at the Presbyterian hospital in Chicago. Mr. Atwill retired on January 1, 1940, after 45 years with the railroad. He started as a telegraph operator, was promoted to train dispatcher, and continued to advance as chief dispatcher, trainmaster, division superintendent, and general superintendent. In 1929 he became general manager of the railroad, and in 1934 he was made vice-president and general manager.

Samuel V. Bevington, assistant division superintendent of the New York Central (Big Four) at Cincinnati, Ohio, and at one time superintendent of terminals at Cincinnati, died on November 12. Mr. Bevington was born at Harrison, Ohio, and entered railway service in 1893 as a fireman of the Big Four. He was promoted to locomotive engineer in 1901 and in 1912 was advanced to road foreman of engines. In 1916 he was promoted to assistant trainmaster, later being advanced to trainmaster and then to assistant superintendent of the Cincinnati-Sandusky division, with headquarters at Springfield, Ohio. In 1924 he was promoted to superintendent of terminals at Cincinnati and in 1933 his title was changed to assistant superintendent of terminals at that point. Mr. Bevington was later appointed assistant division superintendent, with the same headquarters.

F. W. Pfleging, general signal engineer of the Union Pacific system, with headquarters at Omaha, Neb., died on November 17 after a long illness. Mr. Pfleging was born at Terre Haute, Ind., on May 27, 1877, and graduated in electrical engineering from Rose Polytechnic Institute in 1901. He first entered railway service in 1899 as a signal repair man on the Chicago & Eastern Illinois, working for a year prior to his graduation from college. In July, 1901, he went with the Union Pacific as a draftsman, later being appointed successively signal maintainer, inspector, foreman and general foreman. On January 1, 1903, Mr. Pfleging was promoted to signal supervisor at Cheyenne, Wyo., and in February, 1912, he was transferred to Kansas City, Mo. On July 1, 1912, he was promoted to signal engineer of the Union Pacific, with headquarters at Omaha. His jurisdiction was extended over all districts of the Union Pacific System on January 1, 1936, and in August, 1941, his title was changed to general signal engineer, with the same headquarters. He was granted a leave of absence because of ill health in June, 1942. Mr. Pfleging was chairman of the Signal Section of the A. A. R. in 1921.

Table of Freight Operating Statistics appears on next left-hand page

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Freight Operating Statistics of Large Steam Railways—Selected Items

Region, road, and year	Miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (*thousands*)	Car-miles: Per cent loaded	Ton-miles (*thousands*): Gross excl. locos. & tenders	Ton-miles (*thousands*): Net-rev. and non-rev.	Road locos. on line: Serviceable: Unstored	Road locos. on line: Serviceable: Stored	Road locos. on line: B. O.	Road locos. on line: Per cent B. O.
New England Region:												
Boston & Albany	1942	362	205,211	254,301	55,102	5,675	56.4	408,673	167,517	67	..	22	24.7
	1941	362	157,030	165,723	15,034	3,763	66.9	224,763	88,710	66	5	16	18.4
Boston & Maine	1942	1,848	367,330	429,122	45,565	12,532	65.0	830,465	370,575	144	1	25	14.7
	1941	1,894	332,518	380,825	35,381	12,482	72.0	716,288	300,705	144	4	26	14.9
N. Y., N. H. & Hartf.†	1942	1,816	499,113	626,613	58,997	17,215	64.7	1,115,391	488,582	235	..	25	16.7
	1941	1,820	420,268	526,182	39,314	15,816	70.3	868,724	352,299	196	1	62	24.3
Great Lakes Region:												
Delaware & Hudson	1942	849	338,316	419,921	44,314	12,412	63.7	908,475	467,753	152	19	44	20.5
	1941	849	320,404	373,813	40,759	11,931	66.3	796,088	390,366	127	30	83	34.6
Del., Lack. & Western	1942	982	357,198	418,418	59,029	15,201	66.2	1,012,928	467,128	133	26	31	16.3
	1941	983	381,938	433,540	60,721	15,575	72.7	935,703	419,803	144	8	51	25.1
Erie	1942	2,243	912,120	922,531	69,259	40,936	65.1	2,713,121	1,201,938	285	25	91	22.7
	1941	2,250	840,550	890,522	52,877	38,428	67.9	2,364,051	950,696	262	37	116	28.0
Grand Trunk Western	1942	1,026	314,929	317,456	1,968	9,346	62.6	622,214	261,968	71	2	11	13.1
	1941	1,023	265,991	269,283	2,082	8,462	64.1	524,954	197,302	70	..	17	19.5
Lehigh Valley	1942	1,249	488,565	549,768	95,319	20,574	60.6	1,478,543	694,500	135	5	17	10.8
	1941	1,251	392,596	429,906	65,208	15,974	68.6	1,014,435	459,194	138	17	33	17.6
New York Central	1942	10,490	3,699,834	4,040,679	254,502	138,784	60.0	10,038,059	4,584,611	1,225	8	175	12.4
	1941	10,519	3,223,085	3,444,327	220,060	117,150	63.1	7,929,762	3,539,586	1,058	107	236	16.8
New York, Chi. & St. L.	1942	1,657	860,324	875,964	11,031	32,554	62.8	2,209,832	973,102	162	..	20	11.0
	1941	1,672	632,346	646,943	8,943	24,428	68.8	1,484,314	625,088	150	2	15	9.0
Pere Marquette	1942	2,020	386,631	395,878	8,956	11,497	65.8	782,181	359,383	134	5	25	15.2
	1941	2,068	389,070	400,292	8,520	11,275	67.0	715,243	308,067	132	..	23	14.8
Pitts. & Lake Erie	1942	233	101,328	105,519	8	4,348	65.0	377,552	225,661	43	6	7	12.5
	1941	232	97,152	100,937	..	4,211	63.2	361,194	210,065	44	..	19	30.2
Wabash	1942	2,381	834,749	860,210	19,452	28,860	62.5	1,956,247	856,283	177	10	39	17.3
	1941	2,397	616,928	628,712	13,097	21,823	71.4	1,280,839	522,594	149	23	89	34.1
Central Eastern Region:												
Baltimore & Ohio	1942	6,213	2,380,806	2,968,400	333,753	79,256	61.9	5,763,041	2,758,249	903	8	227	19.9
	1941	6,245	1,994,330	2,508,580	281,923	67,345	64.5	4,665,147	2,217,543	842	71	224	19.7
Central of New Jersey†	1942	660	261,186	304,383	63,522	8,944	59.5	667,278	333,231	120	13	19	12.5
	1941	665	212,572	238,156	44,205	6,759	63.2	472,699	233,894	90	14	43	29.3
Chicago & Eastern Ill.	1942	913	209,615	214,118	3,896	6,533	65.3	445,697	211,416	57	..	13	18.6
	1941	925	183,017	183,168	3,068	5,072	68.2	314,368	138,574	59	6	22	25.3
Elgin, Joliet & Eastern	1942	392	143,002	145,274	1,682	3,936	64.3	312,110	168,351	68	..	10	12.8
	1941	390	126,902	128,481	1,335	3,582	61.7	276,600	141,500	63	1	13	16.9
Long Island	1942	374	35,897	37,430	19,828	423	51.6	33,873	13,486	44	..	5	10.2
	1941	375	29,981	31,346	19,609	323	53.2	23,755	8,951	38	4	6	12.5
Pennsylvania System	1942	9,952	4,829,520	5,694,986	742,319	180,869	60.7	13,372,524	6,460,106	1,997	6	145	6.8
	1941	9,954	4,018,789	4,751,212	588,146	158,157	64.7	10,911,258	5,191,967	1,759	77	311	14.5
Reading	1942	1,421	608,504	678,860	89,027	18,881	61.5	1,459,978	769,471	288	8	35	10.8
	1941	1,430	522,514	581,558	72,295	16,461	65.4	1,178,219	607,510	241	20	68	20.7
Pocahontas Region:												
Chesapeake & Ohio	1942	3,036	1,095,657	1,181,916	53,936	49,156	55.4	4,275,123	2,366,811	428	4	80	15.6
	1941	3,053	1,008,841	1,073,119	46,319	47,780	56.8	4,072,939	2,236,834	410	19	66	13.3
Norfolk & Western	1942	2,137	840,353	895,433	66,143	35,922	57.9	3,155,812	1,689,668	315	8	20	5.8
	1941	2,167	755,428	793,279	43,614	34,784	57.9	2,927,760	1,555,900	295	22	20	5.9
Southern Region:												
Atlantic Coast Line	1942	4,999	841,653	869,914	11,606	21,351	63.7	1,438,071	639,745	320	20	23	6.3
	1941	5,050	643,150	653,820	9,526	15,176	66.0	934,208	387,585	262	30	46	13.6
Central of Georgia†	1942	1,783	328,544	335,781	5,367	7,586	68.4	490,479	220,580	107	..	15	12.3
	1941	1,831	289,275	292,481	4,630	6,689	72.8	391,020	169,584	98	..	19	16.2
Gulf, Mobile & Ohio	1942	1,959	363,334	446,442	4,574	11,856	67.6	784,372	372,108	116	..	6	4.9
	1941	1,962	275,210	320,680	2,496	9,036	69.2	549,116	240,485	97	4	8	7.3
Illinois Central (incl.	1942	6,378	1,849,127	1,860,790	38,637	65,650	59.3	4,784,985	2,180,512	620	2	61	8.9
Yazoo & Miss. Vy.)	1941	6,521	1,572,668	1,579,796	27,530	49,153	63.4	3,250,620	1,415,743	602	14	110	15.2
Louisville & Nashville	1942	4,741	1,596,944	1,750,166	47,620	39,270	60.6	2,922,094	1,460,911	441	1	51	10.3
	1941	4,794	1,362,888	1,473,196	38,443	34,959	60.9	2,508,340	1,233,771	352	75	41	8.8
Seaboard Air Line*	1942	4,219	854,206	950,766	13,862	21,970	66.2	1,501,586	703,704	276	..	39	12.4
	1941	4,295	670,576	711,093	6,654	16,858	66.3	1,074,855	472,988	250	..	57	18.6
Southern	1942	6,469	2,044,514	2,089,210	29,703	44,435	66.0	2,899,733	1,288,202	586	..	86	12.8
	1941	6,521	1,741,500	1,771,653	25,524	39,937	67.7	2,406,083	1,032,873	534	1	119	18.2
Northwestern Region:												
Chi. & North Western†	1942	8,122	1,119,855	1,167,693	24,141	35,608	63.4	2,472,740	1,121,652	365	34	146	26.8
	1941	8,280	1,050,576	1,090,868	23,476	33,567	65.0	2,203,120	889,526	342	17	208	36.7
Chicago Great Western	1942	1,447	293,861	300,979	12,132	9,394	68.5	619,601	269,988	75	..	12	13.8
	1941	1,447	285,214	290,082	12,400	9,247	66.9	577,122	231,693	71	1	12	14.3
Chi., Milw., St. P. & Pac.†	1942	10,813	1,588,169	1,681,357	78,264	51,154	66.4	3,498,740	1,628,001	502	35	83	13.4
	1941	10,843	1,531,344	1,593,633	61,439	47,621	63.4	3,159,016	1,371,413	489	24	102	16.6
Chi., St. P., Minneap. & Om.	1942	1,618	247,451	270,959	13,140	6,264	67.9	425,655	199,066	116	6	11	8.3
	1941	1,618	243,305	259,222	11,392	6,204	66.8	390,696	162,976	113	7	17	12.4
Duluth, Missabe & I. R.	1942	546	200,814	201,661	1,813	10,294	51.1	928,385	569,862	55	..	3	5.2
	1941	541	143,048	143,960	1,555	8,015	51.2	717,637	441,184	53	..	5	8.6
Great Northern	1942	8,021	1,310,309	1,312,505	38,828	50,086	63.1	3,738,684	1,843,778	405	13	65	13.5
	1941	7,977	1,213,913	1,215,152	40,332	44,996	60.9	3,295,848	1,536,128	392	8	95	19.2
Min., St. P. & S. St. M.†	1942	4,258	503,721	514,742	9,829	13,357	60.4	971,547	450,935	146	2	7	4.5
	1941	4,251	490,997	501,049	7,076	13,088	65.4	870,198	398,094	131	..	9	6.4
Northern Pacific	1942	6,593	1,018,841	1,089,723	79,699	39,995	71.4	2,645,904	1,283,049	381	11	53	11.9
	1941	6,414	963,432	1,025,037	69,516	35,314	67.9	2,266,923	1,019,536	350	13	65	15.2
Central Western Region:												
Alton	1942	915	293,496	315,832	1,142	8,097	68.4	532,235	223,475	71	..	7	9.0
	1941	915	222,521	245,819	1,356	5,569	65.0	351,355	148,337	65	2	11	14.1
Atch., Top. & S. Fe (incl.	1942	13,193	3,118,020	3,415,833	200,022	100,665	64.1	6,920,009	2,710,532	818	1	118	12.6
G. C. & S. F. & P. & S. F.	1941	13,431	2,614,643	2,880,088	180,393	80,180	64.9	5,178,488	1,891,229	717	42	120	13.7
Chi., Burl. & Quincy	1942	8,888	1,509,700	1,586,187	61,356	51,303	64.1	3,493,009	1,588,777	475	2	51	9.7
	1941	8,923	1,394,013	1,439,975	58,346	44,607	64.6	2,860,538	1,202,103	445	14	87	15.9
Chi., Rock I. & Pac.†	1942	7,892	1,471,930	1,542,716	25,007	40,216	63.4	2,763,610	1,182,549	381	6	87	18.4
	1941	7,917	1,241,033	1,269,605	11,962	33,398	65.5	2,101,344	881,365	361	4	126	25.7
Denver & R. G. Wn.†	1942	2,405	519,554	603,064	91,819	17,416	71.9	1,101,689	502,483	188	4	12	5.9
	1941	2,547	458,396	521,963	66,914	13,303	67.9	860,601	365,288	174	4	12	6.3
Southern Pacific—Pac. Lines	1942	8,304	2,349,251	2,649,087	375,135	91,166	66.5	6,089,608	2,544,899	825	9	119	12.5
	1941	8,504	2,045,732	2,275,612	333,818	76,194	65.3	4,943,911	1,932,725	737	11	122	14.0
Union Pacific	1942	9,848	2,932,028	3,070,734	222,266	104,239	66.6	6,738,132	2,806,103	839	1	56	6.3
	1941	9,872	3,091,040	3,201,093	182,927	92,365	64.6	5,796,003	2,210,343	751	13	90	10.5
Southwestern Region:												
Mo.-Kans.-Texas Lines	1942	3,281	580,606	592,802	9,664	16,150	61.7	1,056,011	436,473	147	..	29	16.5
	1941	3,281	445,387	454,816	7,874	12,089	67.0	720,794	283,779	87	..	90	50.8
Missouri Pacific†	1942	7,117	1,981,580	2,053,237	46,561	63,893	62.5	4,444,230	2,014,083	514	1	51	9.0
	1941	7,110	1,368,559	1,412,166	26,395	41,849	66.5	2,702,346	1,145,837	423	15	61	12.2
Texas & Pacific	1942	1,901	398,257	398,257	4,622	12,364	65.1	830,621	325,312	115	8	24	16.3
	1941	1,891	280,290	280,290	1,666	9,885	69.6	591,822	236,866	86	26	76	40.4
St. Louis-San Francisco†	1942	4,640	1,009,320	1,059,851	21,600	24,425	61.4	1,682,306	721,218	310	..	29	8.6
	1941	4,730	813,971	835,573	14,557	19,284	65.0	1,220,498	506,933	274	11	37	11.5
St. Louis-San Fran. & Texas	1942	159	33,053	34,247	46	489	60.6	33,496	13,437	9	..	3	25.0
	1941	159	28,481	28,646	44	463	63.9	29,866	10,906	10	2	2	14.3
St. Louis Southw. Lines†	1942	1,600	520,053	528,240	6,590	16,900	66.1	1,087,722	455,994	113	2	16	12.2
	1941	1,600	335,153	341,103	4,431	10,807	73.6	618,987	261,316	89	10	24	19.5
Texas & New Orleans	1942	4,364	1,059,250	1,064,206	28,059	28,459	62.1	1,946,758	811,101	243	..	21	8.0
	1941	4,415	756,318	756,471	5,005	19,674	67.4	1,254,707	526,450	235	15	18	6.7

* Report of receivers.
† Report of trustee or trustees.

for the Month of September 1942, Compared with September 1941

Region, road, and year	Freight cars on line: Home	Foreign	Total	Per Cent B. O.	G.t.m. per train-hr. excl. locos. and tenders	G.t.m. per train-mi. excl. locos. and tenders	Net ton-mi. per train-mile	Net ton-mi. per l'd. car-mile	Net ton-mi. per car-day	Car miles per car-day	Net daily ton-mi. per road-mi.	Coal lb. per 1000 g.t.m. inc. loco.	Mi. per loco. per day
New England Region:													
Boston & Albany 1942	415	6,446	6,861	0.4	30,781	2,002	821	29.5	815	48.9	15,425	133	123.5
1941	645	4,756	5,401	1.1	24,447	1,452	573	23.6	520	33.0	8,169	122	75.3
Boston & Maine 1942	3,251	9,858	13,109	2.2	33,289	2,270	1,013	29.6	940	48.9	6,684	90	98.9
1941	3,514	11,101	14,615	2.3	30,242	2,163	908	24.1	702	40.5	5,292	90	87.2
N. Y., N. H. & Hartf.† 1942	4,282	18,798	23,080	1.2	31,523	2,274	996	28.4	697	37.9	8,968	93	93.8
1941	3,931	18,073	22,004	2.8	29,751	2,100	851	22.3	531	33.9	6,452	97	80.8
Great Lakes Region:													
Delaware & Hudson 1942	6,363	5,396	11,759	4.0	43,003	2,704	1,392	37.7	1,337	55.7	18,365	96	74.1
1941	5,693	6,139	11,832	4.4	39,488	2,504	1,228	32.7	1,152	53.1	15,327	99	61.8
Del., Lack. & Western 1942	7,854	9,744	17,598	2.7	46,763	2,862	1,320	30.7	868	42.7	15,856	107	87.7
1941	6,491	10,436	16,927	3.8	41,502	2,476	1,111	27.0	804	41.0	14,235	118	86.2
Erie 1942	13,282	22,594	35,876	1.9	49,678	2,990	1,324	29.4	1,153	60.3	17,862	86	93.6
1941	10,543	22,986	33,529	2.4	48,893	2,833	1,139	24.7	951	56.7	14,084	87	82.8
Grand Trunk Western 1942	2,874	6,806	9,680	3.1	43,318	1,988	837	28.0	889	50.7	8,511	78	136.6
1941	3,544	7,804	11,348	3.9	36,526	1,986	746	23.3	558	37.3	6,429	82	109.8
Lehigh Valley 1942	8,541	20,675	29,216	1.5	48,172	3,128	1,469	33.8	787	38.5	18,535	104	145.1
1941	6,277	13,389	19,666	1.1	48,675	2,631	1,191	28.7	763	38.7	12,235	99	94.8
New York Central 1942	57,322	85,529	142,851	2.9	44,366	2,746	1,254	33.0	1,079	54.4	14,568	89	113.0
1941	63,098	79,898	142,996	6.3	40,539	2,485	1,109	30.2	829	43.4	11,216	93	98.8
New York, Chi. & St. L..... 1942	4,946	12,710	17,656	1.7	48,566	2,575	1,134	29.9	1,818	96.9	19,576	79	171.5
1941	4,688	11,849	16,537	1.7	43,060	2,351	990	25.6	1,271	72.2	12,462	82	140.8
Pere Marquette 1942	4,335	6,921	11,256	2.6	35,918	2,035	935	31.3	1,060	51.5	5,930	86	89.5
1941	5,976	8,260	14,236	2.9	31,295	1,848	796	27.3	716	39.1	4,966	87	97.0
Pitts. & Lake Erie 1942	5,785	8,682	14,467	6.3	50,140	3,732	2,230	51.9	563	16.7	32,283	80	69.1
1941	5,495	8,801	14,296	10.2	49,635	3,724	2,166	49.9	466	14.8	30,182	77	59.8
Wabash 1942	9,516	14,712	24,228	1.0	45,353	2,383	1,043	29.7	1,174	63.3	11,988	99	135.4
1941	8,193	12,497	20,690	1.3	41,467	2,094	854	23.9	850	49.7	7,267	101	86.8
Central Eastern Region:													
Baltimore & Ohio 1942	43,730	48,258	91,988	2.0	31,929	2,472	1,183	34.8	1,005	46.7	14,798	130	100.9
1941	44,091	43,741	87,832	2.5	31,857	2,381	1,132	32.9	851	40.1	11,836	131	86.4
Central of New Jersey† 1942	7,721	19,692	27,413	1.0	31,292	2,606	1,301	37.3	405	18.3	16,830	123	107.5
1941	5,026	16,874	21,900	2.9	27,451	2,297	1,137	34.6	362	16.6	11,724	126	85.1
Chicago & Eastern Ill. 1942	1,845	4,233	6,078	2.5	35,075	2,197	1,042	32.4	1,200	56.8	7,719	106	108.7
1941	2,606	3,875	6,481	3.7	30,274	1,734	764	27.3	722	38.7	4,994	113	74.0
Elgin, Joliet & Eastern 1942	8,122	7,438	15,560	3.1	18,181	2,259	1,218	42.8	363	13.2	14,316	112	90.2
1941	9,326	7,853	17,179	2.8	17,811	2,227	1,139	39.5	271	11.1	12,094	106	82.5
Long Island 1942	22	3,873	3,895	.5	7,399	962	383	31.9	117	7.1	1,202	248	53.7
1941	59	3,865	3,924	.4	5,640	814	307	27.7	75	5.1	796	311	51.0
Pennsylvania System 1942	140,657	109,813	250,470	2.9	38,629	2,840	1,372	35.7	868	40.0	21,638	106	106.9
1941	144,952	94,167	239,119	7.5	38,558	2,793	1,329	32.8	724	34.1	17,387	102	91.8
Reading 1942	16,906	18,706	35,612	4.2	30,333	2,414	1,272	40.8	712	28.4	18,050	115	88.3
1941	15,025	20,756	35,781	7.5	29,304	2,261	1,166	36.9	568	23.5	14,161	126	77.8
Pocahontas Region:													
Chesapeake & Ohio 1942	36,414	15,474	51,888	1.5	56,756	3,968	2,197	48.1	1,504	56.3	25,986	68	89.6
1941	38,429	15,963	54,392	1.3	58,330	4,087	2,245	46.8	1,363	51.3	24,422	66	83.8
Norfolk & Western 1942	30,666	7,889	38,555	1.9	58,898	3,827	2,049	47.0	1,448	53.2	26,356	84	102.3
1941	31,143	6,886	38,029	1.6	61,204	3,934	2,091	44.7	1,384	53.4	23,933	81	89.7
Southern Region:													
Atlantic Coast Line 1942	9,995	16,086	26,081	3.3	28,543	1,711	761	30.0	838	43.9	4,266	105	84.1
1941	10,221	9,503	19,724	7.1	24,505	1,457	605	25.5	653	38.7	2,558	106	70.9
Central of Georgia† 1942	2,621	7,496	10,117	1.5	27,200	1,518	683	29.1	811	40.8	4,124	113	101.2
1941	2,957	6,480	9,437	.7	25,647	1,359	589	25.4	602	32.6	3,087	115	92.3
Gulf, Mobile & Ohio 1942	2,942	7,219	10,161	.9	38,084	2,171	1,030	31.4	1,210	57.0	6,332	109	130.1
1941	2,651	4,967	7,618	2.2	35,336	2,004	878	26.6	1,017	55.2	4,086	101	105.2
Illinois Central (incl. 1942	21,130	33,784	54,914	1.2	39,655	2,624	1,196	33.2	1,340	68.0	11,396	97	99.1
Yazoo & Miss. Vy.) 1941	24,618	26,059	50,677	1.0	32,624	2,103	916	28.8	957	52.4	7,237	112	79.6
Louisville & Nashville 1942	30,864	17,071	47,935	1.7	27,446	1,830	915	37.2	955	42.4	10,271	121	127.5
1941	31,050	14,033	45,083	2.6	28,623	1,845	907	35.3	894	41.6	8,579	113	115.4
Seaboard Air Line* 1942	8,698	16,189	24,887	1.9	28,173	1,799	843	32.0	947	44.7	5,560	114	113.0
1941	9,366	10,313	19,679	2.2	28,243	1,631	718	28.1	805	43.3	3,671	114	87.3
Southern 1942	18,684	27,075	45,759	1.7	24,467	1,439	639	29.0	918	48.0	6,638	137	110.0
1941	18,198	23,816	42,014	4.7	23,469	1,396	599	25.9	817	46.7	5,280	136	96.7
Northwestern Region:													
Chi. & North Western† 1942	25,008	31,297	56,305	3.5	34,230	2,289	1,038	31.5	692	34.6	4,603	109	78.6
1941	27,454	28,337	55,791	6.9	31,521	2,170	876	26.5	531	30.8	3,581	110	70.8
Chicago Great Western 1942	1,303	4,517	5,820	.9	38,111	2,114	921	28.7	1,533	77.8	6,220	108	127.0
1941	1,410	4,977	6,387	1.0	36,673	2,028	814	25.1	1,167	69.6	5,337	106	128.2
Chi., Milw., St. P. & Pac.†.. 1942	29,686	25,290	54,976	1.3	35,246	2,219	1,032	31.8	981	46.4	5,019	108	102.5
1941	33,074	24,281	57,895	1.3	33,184	2,073	900	28.8	768	42.0	4,216	109	98.3
Chi., St. P., Minneap. & Om.. 1942	1,669	7,697	9,366	4.8	22,622	1,776	830	31.8	743	34.5	4,101	99	75.0
1941	1,759	7,828	9,587	3.5	21,394	1,639	684	26.3	567	32.3	3,358	106	72.0
Duluth, Missabe & I. R..... 1942	13,598	455	14,053	2.5	78,710	4,736	2,907	55.4	1,370	48.4	34,790	60	137.1
1941	13,151	484	13,635	1.4	82,878	5,168	3,177	55.0	1,090	38.7	27,183	57	103.8
Great Northern 1942	27,245	24,236	51,481	1.6	43,089	2,871	1,416	36.8	1,206	51.9	7,662	86	100.2
1941	28,351	21,234	49,585	2.2	41,343	2,728	1,272	34.1	1,011	48.6	6,419	90	91.7
Min., St. P. & S. St. M.†... 1942	9,182	6,940	16,122	2.3	31,553	1,935	898	33.8	966	47.4	3,530	88	118.4
1941	9,472	6,650	16,122	2.3	29,699	1,782	815	30.4	813	40.9	3,122	89	125.7
Northern Pacific 1942	20,773	14,494	35,267	3.5	39,916	2,609	1,265	32.1	1,243	54.2	6,487	122	96.3
1941	24,325	12,083	36,408	4.5	37,620	2,370	1,066	28.9	935	47.7	5,298	121	93.4
Central Western Region:													
Alton 1942	977	5,979	6,956	5.9	40,601	1,827	767	27.6	1,016	53.8	8,141	111	141.8
1941	949	6,191	7,140	3.5	38,141	1,582	668	26.6	697	40.2	5,404	130	113.0
Atch., Top. & S. Fe (incl. 1942	55,033	35,479	90,512	3.5	39,119	2,227	872	26.9	992	57.4	6,848	112	135.3
G. C. & S. F. & P. & S. F.). 1941	54,918	19,426	74,344	4.9	39,165	1,987	726	23.6	816	53.3	4,694	110	122.3
Chi., Burl. & Quincy 1942	18,225	22,837	41,062	2.3	39,107	2,327	1,058	31.0	1,283	64.7	5,959	104	113.1
1941	22,739	23,137	45,876	1.9	35,117	2,061	866	26.9	895	51.4	4,491	103	97.3
Chi., Rock I. & Pac.† 1942	12,703	17,380	30,083	3.3	34,008	1,884	806	29.4	1,239	66.4	4,995	107	117.0
1941	13,847	16,246	30,093	3.7	31,234	1,699	713	26.4	954	55.2	3,711	105	92.5
Denver & R. G. Wn.† 1942	8,419	9,148	17,567	2.2	30,826	2,130	972	28.9	964	46.4	6,964	161	120.5
1941	8,717	5,836	14,553	2.8	31,554	1,884	800	27.5	795	42.7	4,781	153	111.2
Southern Pacific—Pac. Lines. 1942	27,962	54,022	81,984	2.2	34,581	2,614	1,092	27.9	1,061	57.2	10,216	101	113.1
1941	27,687	43,324	71,011	2.1	34,772	2,437	953	25.4	925	55.9	7,576	100	108.8
Union Pacific 1942	32,317	40,171	72,488	2.6	41,736	2,320	966	26.9	1,294	72.2	9,498	116	127.6
1941	32,328	38,491	70,819	4.3	40,343	1,898	724	23.9	1,060	68.6	7,463	123	137.5
Southwestern Region:													
Mo.-Kans.-Texas Lines 1942	4,127	7,309	11,436	3.8	33,026	1,822	753	27.0	1,235	74.1	4,434	83	123.2
1941	4,769	6,035	10,804	13.0	31,646	1,623	639	23.5	909	57.8	2,883	80	92.9
Missouri Pacific† 1942	12,254	40,645	52,899	1.2	33,656	2,257	1,023	31.5	1,334	67.7	9,433	107	132.6
1941	12,388	30,252	42,640	1.0	35,286	1,989	843	27.4	949	52.1	5,372	107	104.1
Texas & Pacific 1942	3,309	5,575	8,884	1.0	38,359	2,117	829	26.3	1,223	71.4	5,704	90	97.6
1941	2,357	6,228	8,585	1.7	40,384	2,115	847	24.0	1,000	59.9	4,175	81	54.2
St. Louis-San Francisco† 1942	9,999	10,758	20,757	2.9	32,255	1,677	719	29.5	1,148	63.3	5,181	119	110.9
1941	11,052	9,124	20,176	3.1	29,708	1,507	626	26.3	854	50.0	3,572	116	94.1
St. Louis-San Fran. & Texas. 1942	....	272	272	11.0	19,646	1,016	407	27.5	1,650	99.1	2,817	122	102.3
1941	....	344	344	4.4	22,090	1,050	383	23.6	1,092	72.6	2,286	126	69.9
St. Louis Southw. Lines†.... 1942	2,131	7,232	9,363	.7	33,624	2,108	884	27.0	1,753	98.2	9,500	76	146.1
1941	1,584	4,640	6,224	1.2	35,869	1,853	782	24.2	1,525	85.7	5,444	76	99.0
Texas & New Orleans 1942	4,157	21,625	25,782	1.5	31,264	1,854	772	28.5	1,097	62.0	6,195	82	144.3
1941	4,328	13,432	17,760	2.6	31,720	1,673	702	26.8	988	54.8	3,975	83	100.8

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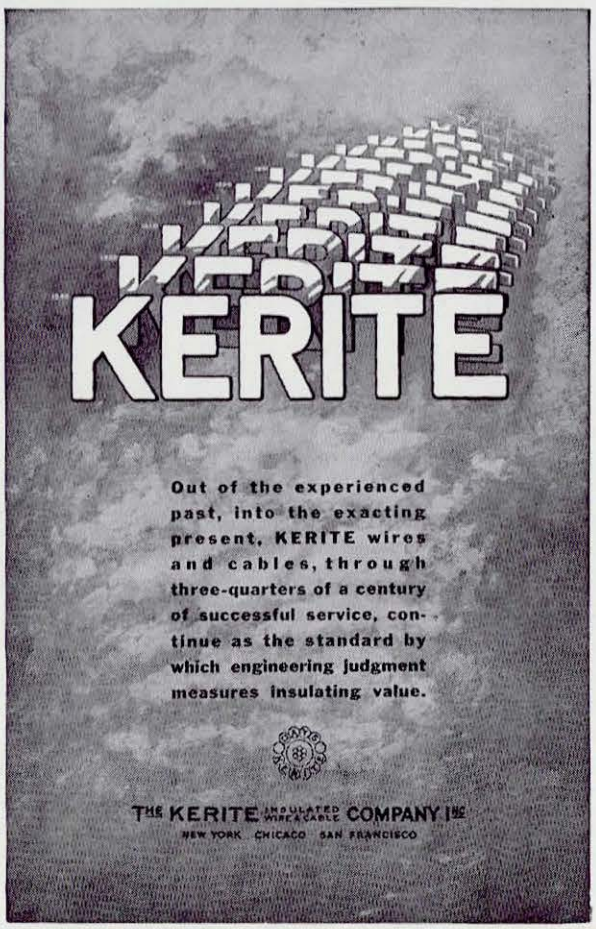
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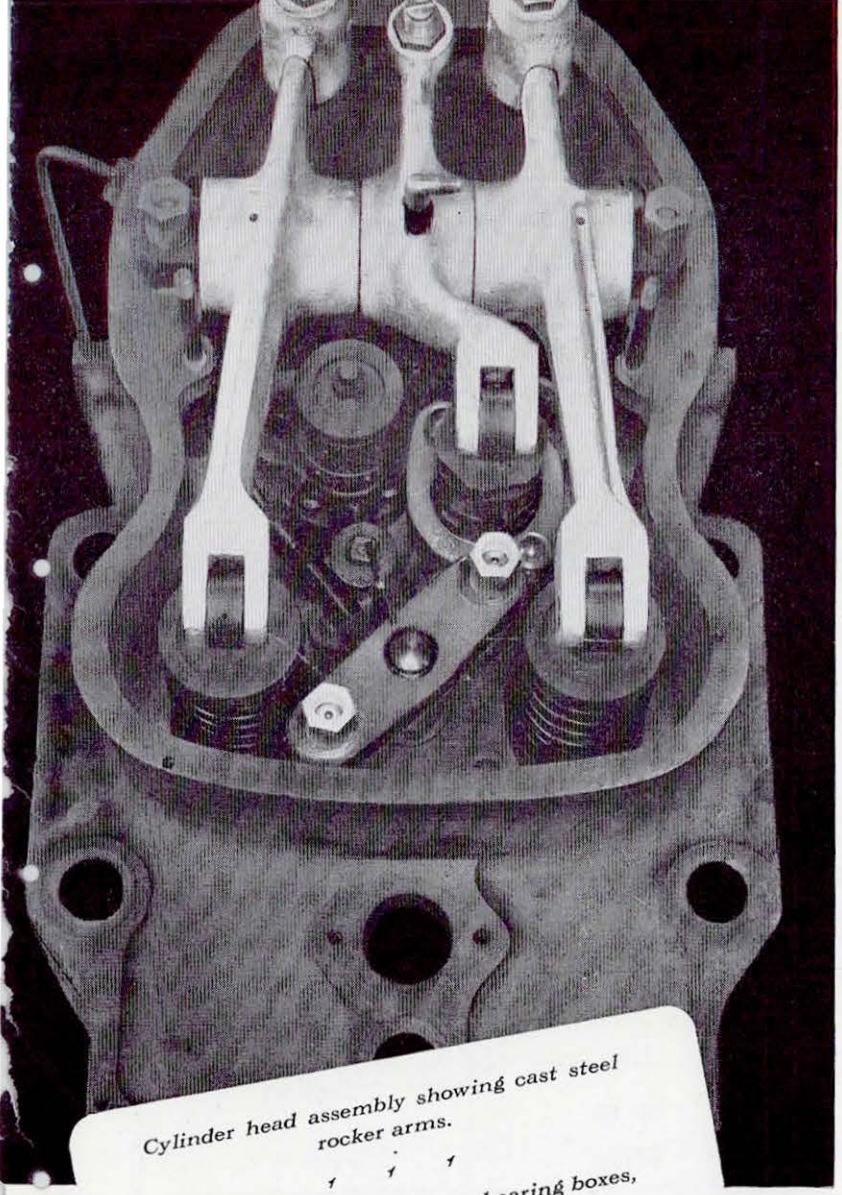
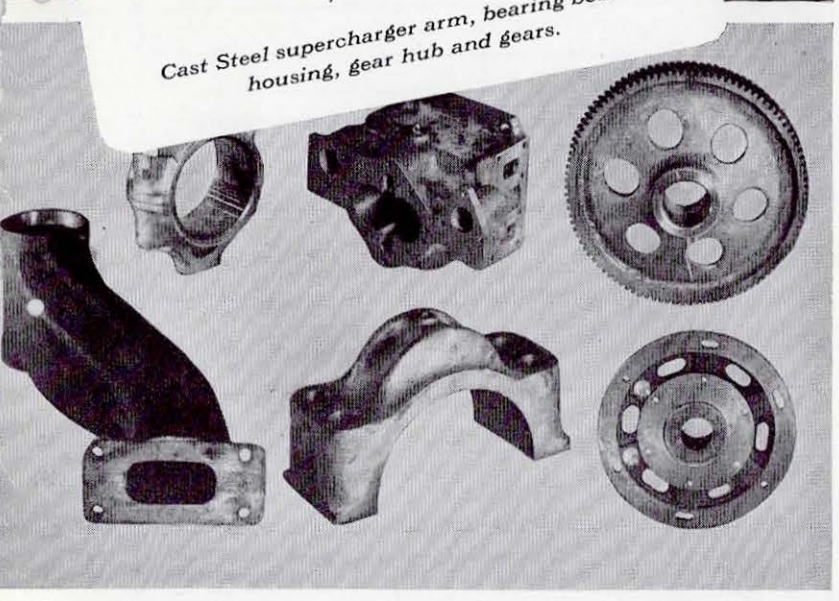


Cylinder head assembly showing cast steel rocker arms.



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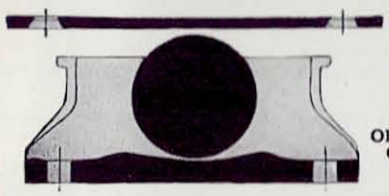

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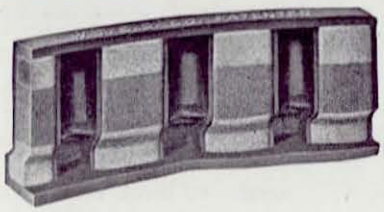

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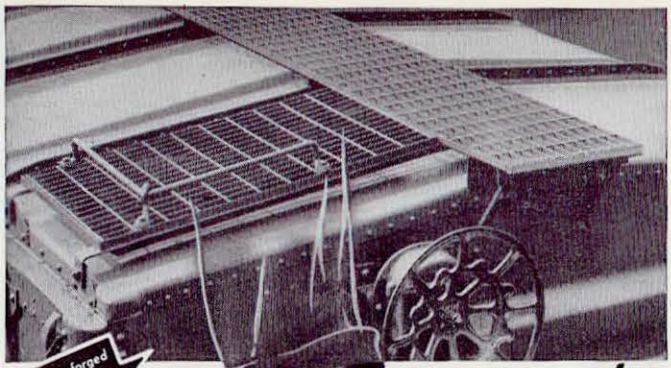

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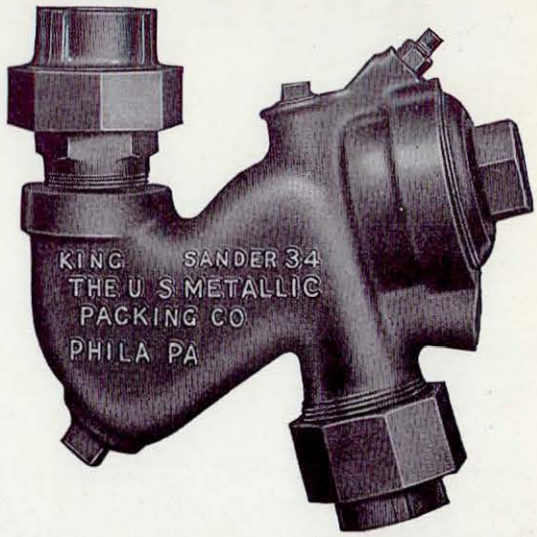

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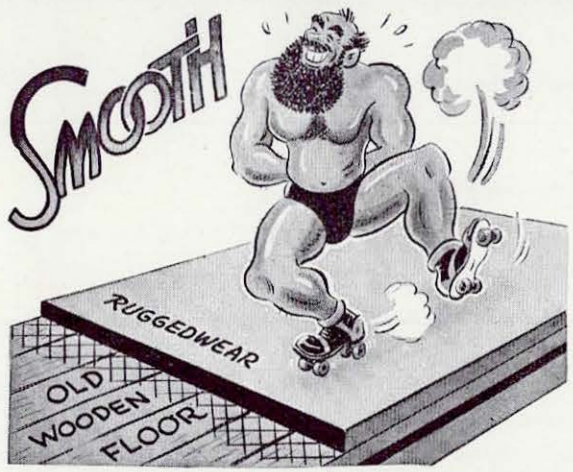

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STEAM – ELECTRIC

The OHIO LOCOMOTIVE CRANE Co. BUCYRUS OHIO

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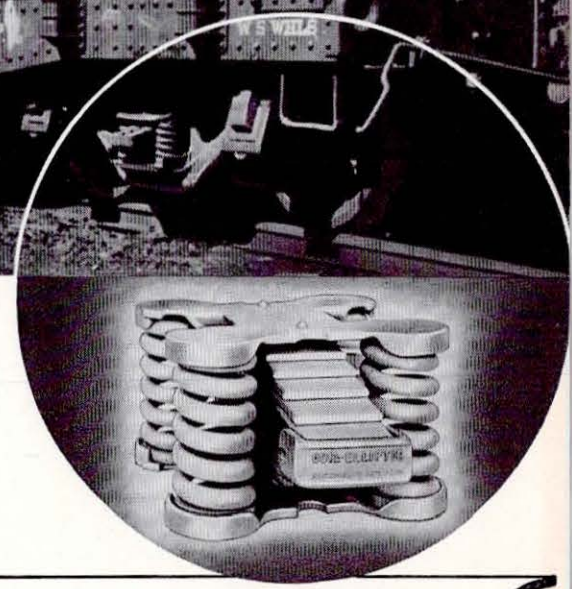

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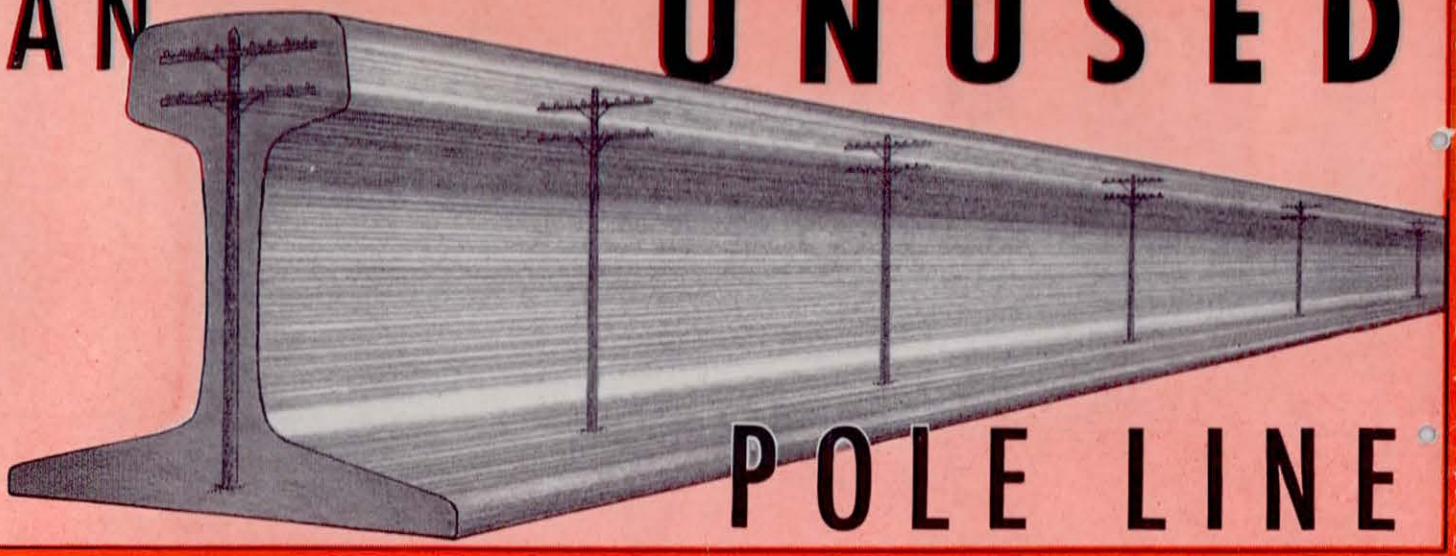

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